Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves
PUBLISHED WEEKLY BY TELEPHONY PUBLISHING CORPORATION
608 S. Dearborn Street, CHICAGO, Telephone Wabash 8604

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Entered as second-class matter September 4, 1908, at the postoffice at Chicago, Ill., under act of March 3, 1879.

Volume 104
Number 12

CHICAGO, SATURDAY, MARCH 25, 1933

Subscription — 10 Cents a Copy
$3 a Year, U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

Old Telephones Removed From Service; Buy New Ones Now

Underlying all the important plans to expedite business recovery is the essential need of maintaining, and materially increasing, the general purchasing power of the country. From President Roosevelt down, and through the various grades of business leaders and expert economists who have been studying conditions and trying to improve them, all have recognized the necessity of stimulating the buying of commodities.

* * *

Normal buying means a revival of manufacturing and distribution, and that, in turn, creates jobs which put men to work and help the employment situation. It requires no insight to understand that as employment conditions improve, general business conditions will improve also.

Increased buying on the part of telephone companies will have a direct, favorable effect on the telephone industry in particular, and indirectly on the business of the whole country.

* * *

Commenting on the "Buy Now" proposition, one telephone man of wide experience says in a letter to Telephony:

"I think one of the most constructive things that could be done with a fair chance of success, would be to start a general program for the purpose of convincing telephone operating companies that they should not put back into service the old telephone instruments that they have taken out. At least, they should not put back into service any of the equipment that is of an obsolete character, and is now almost completely depreciated.

This would have the advantage of being in the long run of real benefit to the operating company and, of course, to the manufacturer immediately. I believe Telephony would be doing the industry as a whole a real favor if it would start a discussion along this line and encourage a campaign in that specific direction."

* * *

The idea is a good one. Many concerns and individuals have carried economy to an unwise extreme during the days of shrinking incomes. It is one thing to retrench from the boom period of 1929 and get down to the earth of 1933, but quite another to chop off all expenditures and make "hoarding" the principal mission in life.

Many of the telephones taken out in the last 2½ years, especially in the rural communities, were about ready for the junk pile, anyway. They had served their purpose and were fully represented in the depreciation reserves. New instruments should replace them when service is reinstated, and the company is sure to find such a course profitable.

Incidentally, such a policy will please the customer who naturally will prefer a brand new telephone to a dingy worn-out instrument that looks like a relic of the early B. D. (before depression) period.

The purchase of new equipment, of course, will help the manufacturers and supply dealers—and that is distinctly in the interest of the whole industry. On them the operating companies must depend for their equipment, and it is to their advantage that manufacturers be enabled to continue their activities and remain in a position to supply the needs.

* * *

In his timely address at the Columbus meeting of the United States Independent Telephone Association, W. R. McCanne, a director of the organization, stressed this point, when he said:

"The best good-will builder in the world is to replace for present subscribers those old, old telephones and private branch exchange switchboards with new and up-to-date equipment. Those telephones and private branch switchboards that have not reached the age of retirement should be re-conditioned now, either in your own shop, or, preferably, in your supplier's factory where the work will be done better and fully as economically.

If these things are done now, they will not only be helpful to the telephone industry and be good-will builders among telephone subscribers, but your whole plant will be improved and the stocks in your storeroom will be in 'good as new' condition, ready for the resumption of growth that is surely coming.

These same ideas apply to the replacement of central office equipment that has outlived its normal life and the replacement of various portions of inside and

outside plant, except in those cases where the telephone company gains added benefit through putting a greater share of the work directly into the territory it serves, which helps to promote the recovery of general business in its territory and stimulates the resumption of its own growth."

* * *

Many telephone companies have heroically effected operating economies that have made it possible for them to function reasonably satisfactorily, notwithstanding losses of revenues due to the depression. They have reduced the working week and done their best to keep their employes in their jobs on a living wage.

Economy, however, should not be carried to the extent of a curtailment in buying equipment and keeping up maintenance, especially when depreciation charges have been set up to cover these very obligations.

On this important point, Mr. McCanne said: "On this question of over-economizing, let me point out that the rates of depreciation which have been adopted by telephone companies are soon to come under even closer scrutiny than heretofore.

"Ever since 1905 I have been helping to get depreciation recognized in telephone company accounting and helping to get fair rates of depreciation fixed on the various classes of telephone property. I do not know of any telephone company that is collecting too much from the public for depreciation charges, but I do know of many telephone companies that are not making adequate use of their depreciation reserves.

I know of many cases where the depreciation rate established assumes that a given central office switchboard will have a normal life of 20 years, a given telephone or a private branch switchboard a normal life of 15 years, a given pole a normal life of 10 years—and yet the telephone company that is writing off its plant at that rate is continuing to use its switchboards, telephones, private branch exchange switchboards and poles considerably beyond that expected normal life.

Those companies must either go ahead with the replacement and renewal of their property at about the normal rate contemplated by their depreciation charges, *or else they will be required to proportionately reduce their depreciation charges.*

The telephone company that keeps up normal repairs, and that spends each month on renewals and replacements of worn-out property the amount it is currently collecting from its subscribers for depreciation charges, is not only helping the telephone industry's employment situation but is showing enlightened selfishness."

* * *

The answer to this is plain. Adoption of the "Buy Now" policy and planning to get busy this spring on replacements and proper maintenance work will justify the past charges for depreciation. If regulatory commissions take cognizance of this angle of the rate situation and ask operating companies why they have not utilized these reserves, it may prove embarrassing. Planning for plant growth may be suspended with some justification, but repairs and replacements should be provided for just as faithfully now as in normal times.

* * *

The statement has been made that purchases for telephone repairs and replacements have been reduced one-half since 1930. It follows, therefore, that if all companies were keeping up current repairs and spending on actual renewals and replacements of worn-out property the amount they are collecting from the public for depreciation reserves, their total volume of buying of equipment and supplies would be at least doubled.

"Buy Now" and plan to carry on your construction program this spring. It will help the telephone industry and also enable you to strengthen your own position.

COMING CONVENTIONS.

South Dakota Telephone Association, Hotel Widman, Mitchell, April 5.

Kansas Telephone Association, Sunflower Hotel, Abilene, April 13 and 14.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 18 and 19.

Pennsylvania State Telephone & Traffic Association, Penn-Harris Hotel, Harrisburg, May 23, 24 and 25.

United States Independent Telephone Association, Tower Room, Hotel Stevens, Chicago, Ill., July 11, 12, 13 and 14.

Place Used Magneto Sets in Condition

Thorough Inspection Advocated of Subscribers' Sets in Storeroom Relative to 100 Per Cent Condition for Use—Obsolete Sets and Any Which Cannot Be Placed in Good Usable Condition at Reasonable Cost Should Be Junked

By U. S. Hannum

When the depression is over, and business once more resumes its normal course and subscribers again return to the telephone companies, Mr. Manager will find—and perhaps be surprised—that long before his list of subscribers has reached its former number, his stock of usable telephones in the storeroom has become exhausted.

Some telephones that have been taken out are obsolete; others came from locations where their appearance was badly damaged; others were exchanged with remaining subscribers to appease dissatisfaction or to give better service; and replacement parts have been taken from others. So, of the telephones taken out, only about 20 per cent (so some of our manager friends estimate) can again be placed in service without extensive repairs.

It would seem to be in the interest of economy, good relations with the public, and good service that these telephones should again go into use in as nearly 100 per cent condition as possible, for repairs can be made much cheaper while centralized in the storeroom than a little later after they are scattered, possibly over 100 or more square miles of territory.

We suggest that a telephone should not be considered merely as something to collect rent for but as a valuable part of the company's assets, and that any betterment on it is really making the company's property more valuable.

With these thoughts in mind, together with the well-known adage that "what is worth doing at all is worth doing well," we are going to recommend a reconditioning that may look extreme to some of our readers. There is no reason why a telephone which can be made to look well by

cleaning with furniture polish, provided it is one of the later shapes and has a good transmitter, receiver and other parts, should not be used without further work.

It should be remembered that the equipment-rebuilding companies get new boxes of late type for about what it costs to take the varnish off and refinish a telephone. Boxes of obsolete shape should be discarded and the parts, if suitable, placed in new boxes of the later shapes which experience has shown to be more desirable.

In repairing any type of telephone, the matter of refinishing small metal parts comes up for consideration, with a choice between nickel plate and black enamel. Our experience has been that it is easier to get good nickeling done in the average city shops than to get good enameling. An inspection of a few very old telephones that have a part nickel and part enamel finish will, we think, convince anyone of the superiority of the enamel finish, but it should be an enamel baked at a temperature of 350 deg. F. or above. A low temperature bake is only a hurried-up drying job and does not have good wearing qualities.

Our own enameling troubles continued until we built our own enameling ovens and had trained our own help to operate them.

A brushing lacquer or paint should not be used, except in a very limited way for retouching scratched screw-heads or similar work. We have seen some excellent lacquers but none that would wear like baked enamel. Some of the telephone manufacturing companies will do enameling for their customers and it is suggested that the work be given to them as being more likely to insure a good job.

The building of an enameling oven which will bake evenly over its interior, is not a simple proposition, and an even bake is necessary for an even gloss and shade. In fact, the whole job of reconditioning can best be done in the shop of the companies doing this work, for considerable equipment is necessary as well as having help especially trained for the work. This is well understood by the larger operating companies which maintain well-equipped and excellently-managed shops for the purpose and concentrate their old apparatus there.

There is no part of a telephone which needs more careful consideration than the transmitter. As a first requirement, it should talk; and as a secondary, but highly important, requirement, it should do so on a reasonable amount of current consumption. This is especially important on magneto telephones as the transmitter is almost the only resistance in the battery circuit and the current from dry cells is expensive.

Transmitters have a tendency to go lower in resistance with age, and an old transmitter may easily take three or more times the current a new one would, besides doing an indifferent job of talking. Some of the manufacturers have, within the last few months, come out with a transmitter of two or three times the former resistance. As they give a "trade-in" allowance on old ones of their makes an exchange seems to be the cheapest alternative, especially if a voltmeter resistance measurement on the old transmitter shows its resistance to be low.

As is well known, the current output of dry cells in use falls off before the voltage lowers much. Thus, with a high resistance transmitter, the batteries will not only last much longer before reaching a given point of exhaustion, but they may be used to a lower point of current output owing to the lower current consumption, thus making a two-fold saving.

Receiver shells and caps, if rough, dull or discolored, may be chucked on a fast-running spindle, sanded and repolished. If of rubber and old, they may have turned yellow, but this can be sandpapered off.

The magnets and coil assembly should be removed and the magnets re-magnetized without fail. This can be done without removing the coils, and then placing a piece of iron across the poles to remain until the receiver is assembled. Any rust should be removed and the magnets lacquered or shellacked to prevent any more rust forming. It adds to the appearance of the job to lacquer also the inside of the cup.

The rim of the cup or shell should be ground perfectly level so that the diaphragm will not spring up or down, depending on the tightness with which the cap is screwed on. It may also be advisable to grind the inside of the cap level where it bears on the diaphragm for the same reason.

The receiver may now be gauged for adjustment; a clearance of from 10 to 15 thousandths of an inch is about right, but this may be varied, depending on the type of receiver. A new diaphragm is then put on and the receiver tested.

It is not a big job to make receiver gauges of sufficient accuracy using strips of steel about ⅛ in. by ⅝ in. by 2¼ ins., a steel straight edge like the edge of a 6-in. scale and a thickness gauge or feeler. It will be found easier to bolt four or five thicknesses of steel together and make that many gauges at once than to try and make one. One edge should show a ten-thousandths-of-an-inch clearance and the other about 16-thousandths. Any attempt to case-harden them after making, to prolong their wear, will likely result in failure as they are very apt to spring on hardening.

Ringers should be measured for resistance, the magnets re-magnetized; the mechanical condition inspected, especially the pivots; any rust removed. If inclined to rust, the magnet should be lacquered. The quickest way to do this is to dip it.

On any work with magnets, one should be careful with lacquer or paint on the part which makes contact with the part it is supposed to magnetize. Paint, of course, will not insulate against magnetism, but it does hold a magnet away from an iron-to-iron contact; and, as the pull of a magnet decreases as the square of the distance increases, it is important to get the closest contact between the magnet and frame that is possible.

In making a magnetizing machine, we ground the joints together, using grinding compound, to get the most intimate contact possible. While we are talking about magnets, we will state the opinion that every magnet which comes in should be magnetized. There are few of them that will not be benefited by it, and magnetizing them takes little longer than testing

SELLING THE SERVICE.

By JOHN G. REYNOLDS.

1. Impress upon your friends, relatives and acquaintances the uses and advantages of toll service. Stress the low cost, the speed and the ease with which toll calls can be made. Every toll call brings in additional revenue, so talk toll service at every opportunity. Every penny which we are able to add to the revenue brings us one step nearer the good old days of full-time jobs.

2. Some employes endeavor to excuse their poor sales records by saying: "I can't sell. I don't know how." If you are among the many who are hiding behind weak excuses and allowing your fellow workers to do all the selling, snap out of it. Get rid of the idea that you can't sell, and you'll sell so many stations that the management won't think of getting rid of you.

3. In some business establishments it is often difficult to hear the ringing signal of the telephone, either because of noise or because the called party is not always near the telephone. Be on the constant lookout for such cases and suggest the installation of a code-calling system.

4. When endeavoring to sell a prospect, use positive and affirmative suggestions. Don't use negative suggestions such as: "You don't want a telephone do you?" Such suggestions automatically close the sale as the prospect usually answers "No."

Recently I received copies of "The Crosstalk" published for the employes of the West Coast Telephone Co., Everett, Wash., and "The News," published for the employes of the Louisiana Telephone Co. The papers were very interesting and I was quite pleased to see our "Selling the Service" pointers appearing in each of them. Has your company an employes' paper? If not, I'd be glad to help you start one.

them, although we always test them afterward. They may be tested on a piece of soft steel of about three and one-half times their weight. What they will lift depends on the contact, whether the ringer magnet is round or square across the end, and similar varying conditions. Experience will soon show what degree of saturation can be secured.

A resistance measurement on generator armatures tells one little of benefit as the older ones are higher wound. As bridging party line telephones replaced series telephones, it began to be realized that current output was as necessary as voltage, and armature resistance was progressively lowered.

Probably the best test easily available for a partly short-circuited armature is to put the generator in good mechanical condition and revolve it without the magnets on. If it turns easily without the magnets and hard with them, it is very likely short-circuited. Other generator repairs consist of replacing worn parts and damaged insulations, and they may well include a coat of lacquer on the magnets.

On any reconditioning job, some winding is likely to be necessary. While this can be done by attachments on the family sewing machine, it will be realized that, as on other parts of the work, the well-equipped shop has an immense advantage. Coils can be rewound, even when using old wire, at speeds as high as 6,000 revolutions per minute or 100 per second when using suitable machinery.

Refinishing wooden boxes or re-enameling metal ones, if it does not make rewiring necessary, at least offers a fine opportunity for doing so. We believe the cabled wiring, using braided generator circuit wire in colors to correspond to circuit prints which manufacturers are prepared to furnish, is now usually preferred. However, if one wishes to have wire in grooves in the back of wooden boxes, the grooves may be easily made.

From a piece of thin steel make a small circular saw, about the size of a half-dollar, and two collars of brass, one for each side, to regulate the depth of the cut. Assemble on a shaft about two inches long, which can be held in an electric hand-drill of the Black & Decker or similar type. This may be run over the work or, perhaps better, the drill may be clamped to a support and the work moved beneath it.

Circuits should be such as are now used by the leading manufacturers and should be followed exactly.

On some of the common battery telephones having induction coil terminals numbered 1, 2, 3, 4, we have known some pretty good engineering departments to state that it made no difference if the wires leading to one winding were transposed. Wiring the coil to a reversing key and testing will quickly show this to be wrong, so we believe circuit drawings should be followed exactly.

This is a good time to decide if telephones on this particular property are to have carbon lightning arresters and to remove them if they are not to be used. Both practices are in use.

One stormy night many years ago a subscriber called and stated that his telephone was ringing all the time; that the top of it was burning, and that it was about to catch his curtains on fire. After a word of advice, we started on a full speed, non-stop run of about three-fourths of a mile through the darkness and storm, listening at every jump for the fire bell and wondering how many subscribers we would lose to our competing company.

On reaching the neighborhood we found that all was quiet. The subscriber had broken the wires leading to the telephone with a hammer, but we acquired some ideas about exposed fuses and carbons which are still with us.

P. S. We are out of work; does someone need a repair shopman?

What Operators Want to Know

Holding and Releasing Toll Circuits and Ringdown Trunks, and Time Allowances for Holding Circuits Continued—When to Hold Toll Circuit Beyond Time Allowance Analyzed—No. 91

By Mrs. Mayme Workman,
Traffic Supervisor, Illinois Telephone Association, Springfield, Ill.

This is a continuation of our instruction of last week for holding and releasing toll circuits and ringdown trunks.

If you are trying to complete a connection between two toll circuits or between a toll circuit and a ringdown trunk for another operator and she AG's the order after you have rung, but before you have completed your efforts to obtain an answer on the toll circuit or the ringdown trunk, say: "I am trying to get them. One moment, please?"

After a call, report, or order has been passed, the time allowance for holding the toll circuit waiting for an answer from the called station or for a report or order is three minutes. However, if the number of the called telephone is obtained from the information operator or another special operator, the time allowance is computed anew from the time this number was passed to the TTC operator.

After the called station has been reached, the time allowance for holding the toll circuit waiting for a report or for the called party to come to the telephone is three minutes for a direct circuit and five minutes for a built-up circuit. If you are referred to another telephone, the time allowance is computed anew from the time this number was passed to the TTC operator. If the calling party gives supplementary instructions concerning the call, the time allowance is computed anew from the receipt of such instructions.

After a WH report requiring further instructions from the calling party has been obtained, the time allowance for holding the circuit waiting to reach the calling party to complete the call or to secure further instructions is three minutes from the time you asked the called station to hold the line or the TTC operator to hold the circuit.

The time allowance for holding a toll circuit should be observed as specified unless you are reasonably sure that a call attempt can be completed and a waste of circuit time prevented by holding the toll circuit slightly beyond the time allowance. If you are in doubt as to whether or not you should hold a circuit, or if you think it desirable to hold it more than a minute or two beyond the time allowance, report the case to your supervisor.

The supervisor will allow the operator to hold the toll circuit beyond the time allowance if she believes that this will hasten the completion of the call and eventually will save circuit time. If she allows the operator to hold the circuit longer, she will keep in touch with her and if a circuit to the desired office or a report has not been obtained within a reasonable time, she will tell her to clear the circuit.

When an operator reports to the supervisor that she has rung on a circuit or ringdown trunk for 30 seconds, but has not obtained an answer, if the supervisor has reason to believe that the delay in reaching the distant office was due to a slow answer, and the plant employe's investigation does not indicate that the equipment is at fault, the supervisor will take up the matter with the distant supervisor if the delay was serious or if similar delays have occurred before.

Questions from Illinois Operators.

1. Where can we have an opportunity to have class instruction for our operators?
2. Where is an "AG alternate point" entered?
3. Should a call be shown as CLR if more than three minutes is taken because of "BY"?
4. Should a new applicant for telephone service be told that the service connection charge is not a deposit and is not refunded when the telephone is disconnected? Many times they insist they have a deposit and bring the receipt for this amount to be refunded.
5. Since the depression are we still to continue the CLR service?

For answers to these questions from real Illinois operators, please turn to page 16.

Oklahoma Holds Annual Convention

Despite National Banking Holiday, Approximately 500 Registered at Annual Convention of Oklahoma Utilities Association in Oklahoma City—Telephone Men Study Pending Problems and Offer Sales Suggestions—Officers Elected

The annual convention of the Oklahoma Utilities Association, which was held March 7 and 8 at the Hotel Biltmore, Oklahoma City, was well attended, the registration totaling approximately 500. R. J. Benzel, of Oklahoma City, vice-president of the Southwestern Bell Telephone Co., was elected president of the association, succeeding R. J. Daugherty, of Bartlesville, public relations director of the Empire Companies.

The other officers of the association are: First vice-president, H. B. Cobban, of Miami, general manager of the Northeast Oklahoma Railroad Co.; second vice-president, C. O. Dunten, of Sand Springs, president of the Oklahoma Power & Water Co.; treasurer, W. R. Emerson, of Oklahoma City, vice-president and treasurer of the Oklahoma Gas & Electric Co.; and manager, E. F. McKay, of Oklahoma City.

On Monday evening, March 6, as a prologue to the convention, a first aid contest was held. The first aid team of the Southwestern Bell Telephone Co. won the silver cup offered in the contest, taking the trophy from the Oklahoma Natural Gas Corp. which had won it twice previously and needed a third victory to hold it permanently.

Among the speakers on the program Tuesday afternoon, March 7, was M. J. Stooker, of Oklahoma City, general manager of the Southwestern Bell Telephone Co., who spoke on the subject, "The Telephone Business in Relation to General Business Conditions." He presented statistics showing the staggering station losses suffered in the telephone industry during the past three years.

Mr. Stooker described the progress of telephonic communication internationally despite the depression, referring to the all but world-wide interconnecting telephone service network by which almost any telephone subscriber in this country may talk with any of the 92 per cent of telephones anywhere, including those on almost a score of the big Atlantic liners. He summarized the losses in the Bell System since 1930 as follows:

The Bell System, nationally, has lost 12 per cent of its telephones, 17 per cent of its local calls and 23 per cent of its long distance business, it was stated. In Oklahoma the company has lost 36,000 telephones, or more than 16 per cent of its service in 1930. Other companies in Oklahoma, serving about 400 of the 550 exchanges, have also suffered great losses. The state has 20 per cent fewer telephones now than in 1930. Long distance telephone revenues in Oklahoma have declined nearly 50 per cent. Notwithstanding these losses, service has improved and expanded.

In 1890, there were 300,000 telephones in the United States, one for every 230 persons. In 1930, there were 20,000,000 telephones, or one for every six persons. The average time required for a long distance connection has decreased from 2.8 minutes to 1.6 minutes since 1929. Service trouble reports have decreased 21 per cent since 1929 and in 1932, trouble reported was cleared the same date in 94 per cent of the cases.

R. J. Benzel, of Oklahoma City, Vice-President of the Southwestern Bell Telephone Co., Was Elected President of the Oklahoma Utilities Association at Its Recent Convention.

The various officers gave reports of activities of the association during the past year. E. F. McKay, manager, among many other things in his report, mentioned plant expansion of the utilities, saying:

"Forecasts at the beginning of the year, aggregating approximately $5,000,000 for extension and improvement of plant by the utility companies of Oklahoma, represent a close approximation to results of these activities for the year.

Fully 70 per cent of this total was expended in the telephone industry, representing completion of underground cable projects by the Southwestern Bell Telephone Co. and substantial improvements and extensions of property by this company and some of the larger of the other telephone groups operating in the state."

The telephone division held special sessions on the morning and afternoon of March 8 with talks by leaders of the industry. While some of the out-of-state speakers did not arrive, there was a gratifying attendance including many from outside of Oklahoma City. Interest in the program was unimpaired by reason of the unfavorable conditions.

A feature of the division program was a talk on "The Place of Sales Work in the Telephone Business" by L. J. Bullis, of Oklahoma City, division commercial superintendent of the Southwestern Bell Telephone Co. Mr. Bullis submitted a detailed analysis of the value of telephone service and emphasized this phase of the subject as the one upon which all successful sales efforts inevitably must depend.

He pointed out the low cost of telephone service in relation to its value; value of telephone service as a protection to the health and happiness of the family; as an economic saving to the family in facilitating commodity purchases and carrying on family and social relations.

Mr. Bullis emphasized the benefit of telephone service to the community as an aid to law enforcement, protection against fire, building of community spirit, administration of community enterprises, contact with other towns, lowering insurance rates, reducing street and sidewalk traffic, affording employment, contributing to public finances through taxes, and expansion of trade territory through convenient communication between buyer and seller.

Other talks in the division meeting were made by H. A. White, Kansas City, manager, American Automatic Electric Sales Co.; H. M. Stewart, Ardmore, district manager, Kellogg Switchboard & Supply Co.; W. O. Mills, Skiatook, state superintendent, Standard Telephone & Telegraph Co., and R. J. Benzel, Oklahoma City, vice-president, Southwestern Bell Telephone Co.

Walter Goggin and Al Sellers, of the Southwestern Bell company, put on a dialogue, entitled "A Toll Sales Interview," which developed the indispensable value of long distance service in business.

W. L. Crittenden, Oklahoma City, chairman of the Oklahoma Utilities Association Speakers Bureau, who has traveled in many foreign countries in recent years, related recent experiences with telephones in China and Japan.

R. J. Benzel described the need for better public understanding of utility prob-

(*Please turn to page* 35.)

Latest Telephone News From England

Well-Planned and Well-Directed Advertising by Post Office Illustrates New Spirit of "Sales and Service"—Newspaper Comment on Work of Post Office Depicts Better Understanding — "By-Path" System at Bethnal Green

By TELEPHONY'S Special London Correspondent

At the British Industries Fair at Olympia, the Post Office has this year a well-staged, well-lit, well-furnished exhibit, displaying some of the many services offered to business men, such as teleprinters, telex service, overseas telephone service, air mail, etc. Space has also been taken by the Post Office telephones for the display of modern telephone service and facilities both at the Ideal Home Exhibition in April and at the Advertising and Marketing Exhibition in July.

Hats Off To The British Post Office.

These facts serve to illustrate the great difference between the British Post Office of 1923 and the British Post Office of 1933; and those who have seen the change evolve gradually are apt, perhaps, to lose sight and perspective of the far-reaching extent of the change, until it is brought home to them.

There is, clearly visible throughout the whole Post Office, a new spirit being manifested; a spirit of sales and service, far removed from the old traditional government department red-tape attitude, which was, if we are to believe newspaper and popular opinion, "Take it or leave it, we don't mind either way." And, in quick and sympathetic response, newspaper comment has reacted to this new helpful spirit and has swung away from the old carping, hostile, contemptuous tone to one of encouragement, better understanding and co-operation.

In no direction is there clearer evidence of the existence of this new spirit than in the Post Office policy towards increasing its telephone business, which is now one of resolute expansion backed by every modern publicity help. The excuse of abnormally unfavorable trade conditions has been swept aside; and the Post Office has gone boldly out on the doctrine that when new business is hard to get, you've got to try harder to get it, or as it has been more picturesquely put, "when grain is scarce the wise bird doesn't stop scratching; he scratches harder."

In the adoption of this doctrine, in its execution and in the results that have been derived, the British Post Office has set an example which might well serve as an inspiration to a good many business houses which seem to think that because a storm is blowing, their best plan is to go indoors, shut the shop and wait vaguely for better times.

The peak of telephone growth in Great Britain was reached in 1929 with an intake (gross) of 271,500 new stations. In 1930 the figure was 264,900; in 1931, 253,000 and in 1932, 264,100. This latter was practically up again to the 1930 figure, in spite of the facts that 1932 was far worse, from a general business point of view, than 1930, and that cessations during 1932 were over 20 per cent higher than in the previous 12 months.

Everything pointed to the likelihood of a definite decrease in new business for 1932 as compared with 1931, a decrease which would almost certainly be not less, probably greater, than that of 1931 as compared with 1930. Subscribers were finding it more difficult, in the economic storm, to keep up their existing facilities, to say nothing of consequent reluctance to add to their commitments by increasing their extensions or P.B.X. installations.

Naturally, it was argued by the timid pessimists, non-subscribers would be found more reluctant than ever before to take on telephone service. But these pessimists left out of account the important fact that it was no longer Post Office policy to wait for business but to go out and look for it; and that from the beginning of 1932 the Post Office has been using advertisements in the press, posters, exhibitions, and leaflets to increase the demand for telephone service.

The figures prove conclusively that the publicity campaign has more than counterbalanced the effect of bad times and of cessations and has been able to bring about a definite, if not precisely calculable, increase in business; not precisely calculable, because it is impossible to say exactly how many cessations were prevented, how many new subscribers were obtained by this publicity campaign, how many by virtue of the cumulative effect of all that has been done before.

The fact remains that in 1932 the British Post Office added 79,700 new telephones to its system. If only a quarter of these—which is surely a superlatively modest estimate—are attributed to the effects of publicity, the investment has been a profitable one. It has, of course, been proved before, and doubtless will be proved again, that in selling telephone service as well as in other businesses, "It Pays to Advertise."

The "By-Path" System.

The 54th automatic exchange within the area covered by a circle drawn at 10 miles radius from the center of London has just been put into service at Bethnal Green.

It has been given the appropriate service name of "Advance" in view of the claim that the new ideas incorporated in this "by-path" system mark a definite advance in automatic working. The problem which these inventors set themselves to solve was to economize on the intricate electrical and mechanical processes that follow each use of the dial.

Advantages of Equipment.

Instead of assembling a series of electrical contacts and holding them until released by the clearance of the line at the end of the conversation, dialing under the new system is designed to gather the required contacts to a final point when, instantaneously, the intermediate machinery is automatically released and thus becomes available for new traffic while the conversation is proceeding.

From the user's point of view, the time-saving factor is the most important. But it will be clear to telephone men that swift release of expensive switching mechanism means that less apparatus is required for a given volume of traffic. The saving in this respect alone is claimed to amount to 50 per cent.

This experimental installation in the new Advance exchange is the result of the decision of the Post Office engineers to give the apparatus a trial on a large scale under working conditions. The whole exchange equipment has been put in by the patentees in token of their readiness to be judged by results.

The Bethnal Green building was designed to accommodate equipment sufficient to deal with normal traffic from 10,000 lines, but not more than half the available space has been taken up by the installation of the "by-path system." Defects or failures are automatically indicated by lights and bells.

Telephones in England.

The exact figures of British telephone development at the end of December, 1932, are given in the Telegraph & Telephone Journal for March as follows:

Post Office exchange stations	2,077,019
Hull Corporation	17,771
States of Guernsey	4,675
States of Jersey	4,033
Railway and other telephones with exchange connections	15,427
Total	2,118,925

This is a total increase of 66,293 stations for all the systems in England. The British Post Office also owns and maintains 27,484 private lines in addition to its system for use of the public.

The Financial Side of Companies

Miscellaneous Items of Interest Regarding Financial Matters of Telephone Companies—Bell Companies Losses in Stations and Earnings—Figures From Monthly Reports of Larger Companies to Interstate Commerce Commission

Analysis of Station Gains and Losses of Southwestern Bell.

Despite a total loss in telephones of 133,274, or 10.1 per cent of telephones in service on January 1, 1932, 16 exchanges in the Southwestern Bell Telephone Co.'s area gained telephones during last year, according to an analysis made by the general commercial engineer. Nine districts showed gains during the last four months of the year. Loss percentages in all areas held close to that of 10.1 per cent for the company.

The greatest station losses, in actual numbers, for all areas occurred in one-party residence telephones. The per cent loss, however, was greater in two-party telephones. Four-party service gained in all areas except Eastern Missouri, which also showed a relatively small loss in residence telephones as compared to trends elsewhere.

The gain in four-party service is accounted for by customers changing from one and two-party in an effort to retain service while forced to reduce expenditures. Sales efforts, directed toward disconnect applicants, offer the cheaper four-party service as a final resort.

A consistent gain in all areas may be noted in the number of handsets. The greater increases on this item, both in number installed and in percentage figures, occurred in Oklahoma and Texas. Large gains in percentage were also made in the number of wiring plans and key cabinets installed. Eastern Missouri had the biggest gain in wiring plans; Oklahoma in key cabinets.

The analysis seems to indicate greater percentage losses in smaller exchanges, except where these are protected by some special factor, such as oil developments, or operation of schools or government institutions. In general, where a community depended mainly upon agriculture or some other single industry, it tended to show a greater loss than one in which more diversified activities kept up a flow of business.

Reports of Nebraska Companies Show Status of Year's Operations.

The reports of most telephone companies for the past year show a loss in telephone stations. Brief summaries of recent reports filed with the Nebraska State Railway Commission follow:

Dubois Telephone Co. of Dubois, H. S. Dill, president; Frank Stefan, vice-president; Max Church, secretary, and Porter Sopenbooer, manager:

Fixed investment, $16,101.42; total assets, $17,882.85; common stock, outstanding, $8,100.00; depreciation reserve, $491.33; surplus reserve appropriated, $7,950.71; exchange revenues, $4,095.65; toll revenues, $174.29; total telephone revenues, $4,269.94.

Maintenance expenses, $1,711.64; depreciation (red), $56.48; traffic expenses, $840.00; commercial expenses, $548.34; total telephone expenses, $3,043.50; net telephone earnings, $1,226.44; miscellaneous charges, $22.40; taxes paid, $240.00; interest paid, $120.00; dividends paid, $584; profit and loss, $966.40; number of stations at end of year, 248, a loss of 36.

Havana Telephone Co., of Indianola, N. J. Uerling, president; Jacob Randel, vice-president, and F. B. Duckworth, secretary, treasurer and manager:

Fixed investment, $36,665.81; total assets, $46,938.09; common stock, outstanding, $15,000; depreciation reserve, $12,702.67; surplus reserve appropriated, $19,347.02; exchange revenues, $6,613.90; toll revenues, $474.31; total telephone revenues, $7,088.21.

Maintenance expenses, $2,598.18; depreciation, $677.82; traffic expenses, $1,320; commercial expenses, $1,520.32; total telephone expenses, $6,116.32; net telephone earnings, $971.89; miscellaneous income, $156.72; taxes paid, $308.11; miscellaneous charges, $326.85; dividends paid, $750; loss, $256.35; number of stations at end of year, 282, a loss of 110.

Hickman Telephone Co. of Hickman, J. A. Brendle, president and manager; F. C. Lesoing, vice-president; Minnie B. Hemple, secretary and W. R. Judah, treasurer:

Fixed investment, $14,448.11; total assets, $17,205.12; common stock, outstanding, $6,435; depreciation reserve, $5,492.12; surplus reserve appropriated, $4,680.15; exchange revenues, $2,945.91; toll revenues, $165.87; total telephone revenues, $3,118.78.

Maintenance expenses, $833.46; depreciation, $366.54; traffic expenses, $730.90; commercial expenses, $529.20; total telephone expenses, $2,460.10; net telephone earnings, $651.61; miscellaneous income, $17.19; taxes paid, $131.02; miscellaneous charges, $46.15; profit and loss, $491.70; number of stations at end of year, 186, a loss of five.

Plainview Telephone Co., of Plainview, unincorporated, Mary Derlin, secretary: Fixed investment, $37,434.65; total assets, $45,500; common stock, outstanding, $24,112.50; depreciation reserve, $9,547.69; surplus reserve appropriated, $11,697.61; exchange revenues, $10,762.30; toll revenues, $1,557.63; miscellaneous revenues, $33.78; total telephone revenues, $12,353.71.

Maintenance expenses, $1,694.00; depreciation, $706.00; traffic expenses, $2,705.33; commercial expenses, $1,790.60; total telephone expenses, $6,904.93; net telephone earnings, $5,448.78; taxes paid, $445.50; profit and loss, $5,003.28; number of stations at end of year, 452, a loss of 35.

Unadilla Union Telephone Co., of Unadilla: O. G. Stoner, president; W. C. Botsford, vice-president, and Thomas Rodaway, secretary, treasurer and manager:

Fixed investment, $19,144.82; total assets, $29,540.47; common stock, outstanding, $7,860; depreciation reserve, $20,181; surplus reserve appropriated, $2,710; exchange revenues, $2,562.45; miscellaneous revenues, $83.64; total telephone revenues, $2,646.09.

Maintenance expenses, $453.17; depreciation, $1,546.75; traffic expenses, $1,000; commercial expenses, $355.90; total telephone expenses, $3,355.82; net telephone earnings (red), $709.73; taxes paid, $82.73; dividends paid, $230.80; loss, $1,023.28; number of stations at end of year, 196, a loss of 40.

New York Bell Dipped into Surplus to Pay Dividends.

The pamphlet report of the New York Telephone Co. for 1932 shows a net income of $27,671,139 after all charges, taxes and depreciation. This is equal, after preferred dividends, to $7.01 a share earned on 3,713,000 common shares, against $35,323,950, or $9.08 a share, earned in 1931.

Of the $8 dividend declared on the common stock in 1932, the company paid $3,657,861 out of its accumulated surplus, which was $53,721,460 at the end of the year. Surplus after dividends in 1931 was $3,994,950 for that year.

Telephone operating revenues in 1932 amounted to $196,320,773, against $211,636,600 in 1931. Expenses, maintenance and depreciation were $138,097,533, compared with $149,011,001, and net earnings abter taxes and uncollectibles were $41,017,417, against $46,972,298. Gross income was $44,221,919, contrasted with $51,561,794.

There were 609,896 telephones installed, 855,036 disconnected, 53,218 added through merger of six wholly-owned up-state companies and 848 added through purchase in 1932, resulting in a net decrease of 191,074 telephones, or 7.4 per cent. The 2,407,604 telephones in service at the end of the year were about the same as at the close of 1927.

The daily average of originating local and toll telephone calls in 1932 was 11,110,000, a decrease of 5.4 per cent from 1931. Net telephone earnings were at 4.60 per cent of the book cost of the average plant in service, compared with 5.60 per cent in 1931.

"The high quality of the local and toll service and all other branches of the service was maintained throughout the year," President James S. McCulloh says in his report, "and in some important respects was improved. The average speed of service during 1932 on all toll calls, whether between points in the company's territory or to points anywhere in the nationwide Bell System, was 63 seconds.

"The present rates of the company in the state of New York were fixed by orders of the public service commission during 1930. In 1932 the return under these rates was 4.86 per cent on the value of the property as determined by the commission in 1930, plus net additions and but 4.60 per cent on its actual cost."

The report says that no additional permanent financing was effected in 1932 and that sales activities by employes were tangibly recorded in an average of 5.4 sales by each worker.

Construction work in 1932 was limited to that required to complete projects well under way and to care for necessary replacements and for demands for service in new locations. Gross additions amounted to $51,803,261, and plant costing $58,972,952 was retired, a difference of $7,169,691. About half the amount expended for gross additions to the company's plant was on telephone installations.

The company continued the part-timing of its employes in 1932, providing employment for about 9,000 more than would have been required had the plan not been followed. On May 1, 1932, employes of all ranks were placed on a part-time basis. At the close of 1932 there were 51,633 employes on the company's rolls, of whom 20,109 were men and 31,524 women.

Working assets at December 31, 1932, amounted to $24,782,900, including $7,091,467 cash. Total plant was $771,394,516 and other permanent investments were $36,499,672. Working liabilities were $10,952,757 and accrued liabilities $5,938,834. The company owed $102,950,000 to the American Telephone & Telegraph Co.

Wisconsin Bell Shows Drop of Nearly One-third in Earnings.

The annual report of the Wisconsin Telephone Co. for 1932 shows a net income of $1,351,000 after an appropriation of $233,389 for possible refund of certain revenues included in income for the year. This is equal after preferred dividends, to $2.51 a share on the 400,000 shares of common stock outstanding. This compares with net income of $2,853,000 the previous year.

Gross revenues were $15,903,013, compared to $17,831,244 the previous year. Operating income, or net after providing for taxes and uncollectible revenue, was $2,054,251, against $3,066,932 in 1931, a decrease of $1,012,681.

Fixed capital at the close of the year was $78,144,706, an increase of $2,034,872 during the year.

A decrease of 43,653 telephones in service during the 12 months of 1932 was reported. During 1931 the company reported a net loss of 2,140 telephones.

Dakota Central's Annual Report

Revenues Considerably Below Preceding Year; Drastic Cuts in Expenses Insufficient to Balance Decreased Earnings—Explanation of Factors Influencing Rates Beyond Management Control

The annual report of The Dakota Central Telephone Co., Aberdeen, S. D., shows total telephone earnings for 1932 of $1,358,451 and total telephone expenses of $1,121,037. The net telephone earnings were $237,414. After deducting interest charges and payments of dividends on the preferred stock there was left $108,596 which fell short by $40,779 of being sufficient to pay the regular common dividend.

The number of main telephones installed during the year was 9,278 while the service was discontinued at 13,547 main stations. The number of owned telephones in service at the close of the year was 33,856, which is 4,189 less than the year before. The exchange revenues for the year decreased by a little more than $76,000 or 8.31 per cent; the toll revenues decreased a little more than $126,000, or 20.37 per cent, while the total revenues decreased 13.26 per cent.

"At the beginning of the year it was apparent that revenues for at least a few months would be considerably below the preceding year, so drastic steps were taken to further reduce expenses," says President J. G. Crane and Vice-President and General Manager W. J. Brazell, for the directors in the report. "This was accomplished by reducing forces to the minimum and placing in effect a general decrease in salaries and wages that affected all employes except those in the lower wage bracket. Following this, further force reductions were made each month during the year as business receded, and a second general decrease in salaries and wages was placed in effect during the latter part of the year.

"Regardless of all the measures taken to keep the earnings of the company on a satisfactory basis, the revenues receded with greater velocity than expenses, as there are many items of expense such as taxes, depreciation, rents and interest that are pretty much fixed charges and, as a result, the net earnings of the company were about $69,000 less than in 1931. The net earnings were sufficient to pay interest on our outstanding bonds and borrowed money and dividends on preferred stock, but fell short by $40,779 of earning the regular common dividend.

Following the drought and grasshopper visit, which reduced the 1931 crop to the smallest in 40 years, the 1932 yield was somewhat better than average but low prices in effect for farm products meant the farmers experienced the equivalent of two crop failures in successive years. There were practically no crops raised that paid the cost of production. Inasmuch as the territory in which we operate is wholly dependent on agriculture, it is obvious there must be an improvement in farm commodity prices before business in our territory is again on the upgrade.

Your property has been reasonably well-maintained throughout the year and the service kept up to a satisfactory standard.

The all-employes' service sales work has now been in effect three years. At first many employes, whose daily work did not call for contact with subscribers, were timid and quite ineffective in sales work; but now with the experience gained and the urgency of the situation, practically all employes are capable of selling service and many who disliked the work at first now enjoy their sales work. A total of 4,330 service sales was made by employes for the year.

More than ever in times like these, the security of the bond and stockholders in this, as well as any corporation, depends upon the ability of its management and employes to be energetic, resourceful and exercise good common sense in their daily tasks and duties. Your directors are pleased to acknowledge a splendid spirit of cooperation, loyalty and accomplishment on the part of its force for 1932.

As is to be expected with business and the price of commodities at present levels, many requests for reduction in telephone rates were received from subscribers. In order that all stockholders may fully understand the questions involved in this matter let us make this explanation:

(a) The nature of the telephone business is such that the service can be best

and most economically performed in any given community or area by one company —hence it is not a competitive business.

(b) Since it is not a competitive business it is regulated by the state to insure that telephone users receive adequate service at fair cost.

(c) Since the business is regulated, the laws of our states and the constitution of the United States say in effect that we are entitled to earn a fair return on a fair value of our property. This is not a guarantee. It simply means you are permitted to charge rates that will accomplish this result, providing the value of the service to the subscriber is greater than the cost to him.

(d) Since the earnings are limited to a 'fair return' at any time, it can be seen that must mean year in and year out, for losses once incurred can never be retrieved. The courts have ruled many times on this point.

(e) You, of course, would never have invested your money in the business if, after investigating, you thought the state or the telephone users would ever take the stand that you must be limited to a modest fair return in years of good business and in years when business was only medium, the return would be small, while in years when business is poor, you would receive no return at all. This treatment would ultimately mean there would be no capital available with which to conduct the business.

(f) Sometimes the complaint is made that the industry is overbuilt, and that is why rates cannot be reduced. Due to the fact that the telephone business is what is termed a natural monopoly or a non-competitive business, the regulatory bodies have almost universally ruled that telephone companies furnishing service to a city or area must be prepared to furnish service within a very reasonable time after application is made.

What would be the feeling if a doctor, grocer, business man, skilled worker or a day laborer, depending on the telephone to conduct their businesses, or provide employment, were unable to secure service on very short notice after moving into a community? A little more than two years ago when we had the maximum number of telephones in service, there were only sufficient spare facilities in our plant to provide for a few months' growth based on nearly 30 years' experience.

(g) It is difficult sometimes for the telephone user to differentiate between the terms 'service' and 'commodity.' When commodity prices recede month after month, as they have in the past three years, it is probably only natural the telephone user should associate the two and, without giving the matter his close attention, reason that his charges for telephone service should follow closely the price trend of commodities. The telephone company provides a 'service'; it does not sell a 'commodity.' Telephone service costs are made up of many items; but the one item of investment in plant and property determines half of the cost of producing service, as depreciation, taxes and return are based largely on investment.

Once the investment is made in telephone plant it becomes a long-term investment averaging 15 years or more. Therefore, the day-to-day or year-to-year trend in commodity prices has very little effect on half the cost of producing service; and none at all if business recedes with the downward commodity price trend, as that means no new telephone plant is being added to reduce the average investment.

The other half of the cost of producing service is affected to only a moderate extent by "commodity" prices. Let us illustrate by the expense item, 'transportation'—either railroad or company-owned car.

Naturally our business requires a great deal of transportation in moving materials, repairing plant, installing or removing telephones, moving pole lines due to road work, etc. The cost of railroad transportation is slightly higher than five years ago. Company-owned car and truck costs are about the same, for the savings in gasoline, tire and accessory prices are offset by higher taxes on gasoline and trucks.

The item of wages, of course, is the largest single factor in the other half of the cost of producing service. In an earlier part of this report we have advised you of the action taken by the management to reduce this item.

(h) Now let us examine the revenues and expenses of the company to see if rate reductions are now or have been possible. We will compare the year 1930, in which the company obtained its largest revenue, with 1932. The expenses will be divided between *fixed expenses* like taxes, interest, rents, depreciations, etc., and *partially controllable expenses* like maintenance, traffic, commercial, accounting and general expenses where wages, materials, traveling expenses, etc., are the major contributing items.

	1930.	1932.	Decrease.
Total revenues.	$1,684,622	$1,362,933	19.0
Fixed expenses	603,632	625,321	*3.6
Partially controllable expenses	801,978	603,285	24.0
Total expenses	1,405,610	1,228,606	12.6
Net earnings	279,012	134,327	52.0

*Increase.

Bear in mind that these figures show if our rates for 1932 were even 10 per cent less we would not have earned any return for either our preferred or common stockholders. Most, but possibly not all, of you are aware that the Dakota Central Telephone Co., since it was organized in 1904, has never had a net earning in any one year of as much as 8 per cent on the money invested in the business; in fact, in only one year did it closely approximate that figure. The average has been less than 6 per cent. A perusal of the balance sheet will show how conservatively the company is capitalized."

BALANCE SHEET, DECEMBER 31, 1932.

Assets:	
Plant and equipment	$6,488,392
Materials and supplies	107,352
Investments	41,011
Cash and deposits	74,397
Receivables	155,122
Total	$6,866,274
Liabilities:	
Common stock	$1,867,192
Preferred stock	395,850
Funded debt	1,292,500
Bills payable	476,711
Other payables	153,892
Reserves for depreciation	1,838,937
Surplus	841,192
Total	$6,866,274

INCOME STATEMENT, 1932.

Revenues:	
Exchange revenues	$ 844,766
Toll revenues	494,440
Miscellaneous operating revenue	19,245
Total telephone revenues	$1,358,451
Expenses:	
Operation	$ 455,413
Current maintenance	196,504
Depreciation	322,983
Taxes	146,137
Total telephone expenses	$1,121,037
Net telephone earnings	237,414
Sundry net earnings	3,548
Total net earnings	$ 240,962
Deduct interest	106,635
Balance net profits	$ 134,327
Dividends, preferred	25,731
Available for common dividends	$ 108,596

Note: Common dividends paid, $149,375.

The officers and staff of the company are: President, J. G. Crane; vice-president and general manager, W. J. Brazell; vice-president, C. B. Randall; treasurer, V. E. Chaney; secretary, Ranford Dunlap; assistant secretary and assistant treasurer, A. H. Clark.

Assistant secretary and assistant treasurer, G. A. Anderson; general auditor, M. J. Cronland; chief engineer, L. S. Siekmeier; general superintendent, J. F. Zietlow; commercial superintendent, F. H. McGinnis; traffic superintendent, A. C. Fredrickson.

January Financial Operation of Bell System Companies.

The American Telephone & Telegraph Co. reported a gross of $6,651,153 and operating income of $459,497 for January of this year, as against a gross of $8,285,666, and operating income of $1,141,845 for the same month of 1932.

The report excludes non-operating in-

come, such as dividends or interest received, and non-operating charges, such as interest and rents paid.

Reports of two Bell System companies for January follow. Due to revision of the uniform system of accounts of the Interstate Commerce Commission effective January 1, 1933, the figures, shown for 1932 have been adjusted on an estimated basis so as to be comparable with the figures shown for 1933.

Bell Telephone Co. of Pennsylvania.

	1933.	1932.
January gross	$5,140,166	$6,016,339
Operating income	1,149,232	1,247,039

Southwestern Bell Telephone Co.

January gross	$5,600,901	$6,397,612
Operating income	1,112,365	1,003,875

Income of Class A Companies Decreased 17.9 Per Cent Last Year.

The summary of monthly reports of 104 class A telephone companies, each having annual operating revenues in excess of $250,000, as compiled recently by the Bureau of Statistics of the Interstate Commerce Commission, shows total operating revenues of $81,903,800 for the month of December, 1932. This represents a decrease of 14.2 per cent as compared with the operating revenues of $95,483,922 for the corresponding month of the preceding year.

The operating expenses for December, 1932, totaled $56,175,303, a decrease of 16.8 per cent compared with $67,534,167 for the corresponding month of 1931. The operating income for the same month of 1932 amounted to $18,540,201, a decrease of 7.4 per cent compared to $20,015,215 for December of 1931.

For the 12 months ended with December, the summary shows total operating revenues of $1,031,429,879, a decrease of 11.0 per cent over the same period in 1931. Operating expenses amounted to $702,575,793, compared with $781,214,275 for the same period of 1931, a decrease of 10.1 per cent.

The operating income for the 12 months' period, $224,251,636, represents a decrease of 17.9 per cent compared with the corresponding period of the preceding year when the operating income amounted to $273,099,276.

The ratio of expenses to revenues was 68.12 as compared with 67.41 for the 12 months' period in 1931. At the end of December, 1932, the class A companies had in service a total of 15,142,489 telephones, as compared with 16,964,049 at the end of 1931, a decrease of 1,821,560 instruments, or 10.7 per cent, compared with the corresponding period of the preceding year.

Complete data for the United Telephone Companies, Inc., were not available for inclusion in this report.

Answers to the Traffic Questions Presented on Page 10.

1. This instruction may be had in the district meeting and state convention traffic schools conducted by The Illinois Telephone Association and by having your manager arrange to have the traffic supervisor of the association spend some time in your office to instruct your operators.
2. In the space for reports.
3. No. We do not consider that CLR service has been given on a call unless the call is passed without delay.
4. We should be sure in every case that the applicant for telephone service understands that the service connection charge is not a deposit—as is often required by light and power companies when applying for their service—but a charge that is made by the telephone company to partially reimburse it for expenses incidental to making the installation.
5. Yes, by all means.

Current Price Quotations on Listed Telephone Stocks

	March 18, 1933. High.	Low.	Last.
American Telephone & Telegraph Co.	106⅞	100⅞	102¾
Associated Telephone Utilities Co.	1	½	½
Bell Telephone Co. of Canada	89	88½	89
Cincinnati & Suburban Bell Telephone Co.	62	62	62
Chesapeake & Potomac Telephone Co. pfd.	116¼	116¼	116¼
International Telephone & Telegraph Corp.	8⅜	6⅞	7
New England Telephone & Telegraph Co.	83¼	82½	82½
New York Telephone Co., 6½% pfd.	116	115½	116
Pacific Telephone & Telegraph Co.	78⅛	75	78
Pacific Telephone & Telegraph Co., pfd.	107	107	107

BID AND ASKED QUOTATIONS.

	Bid. Mar. 18.	Asked. Mar. 17.	Bid.
Lincoln Telephone & Telegraph Co.	85	..	85
Mountain States Telephone & Telegraph Co.	90	95	90
Northwestern Bell Telephone Co., pfd. (6.50)	104	107	104
Peninsular Telephone Co., $1.40	8	10¾	8
Peninsular Telephone Co., pfd., 7	67½	74	67
Rochester Telephone Corp., 1st pfd.	99	103	99
Southern New England Telephone Co., 8	97	99	97
Wisconsin Telephone Co., pfd.	100	104	100

Bell of Canada's 1932 Operating Revenues Down 4.1 Per Cent

The financial statement of the Bell Telephone Co. of Canada for 1932 shows oper-

(*Continued on page* 21.)

Items.	Month of December 1932	1931	Increase or decrease (*) Amount	Ratio, Pct.	Twelve months ended with December 1932	1931	Increase or decrease (*) Amount	Ratio. Pct.
Number of company stations in service at end of month	15,142,489	16,964,049	*1,821,560	*10.7	.....	.....	.....	...
Revenues:								
Subscribers' station revenues	$53,042,514	$60,008,048	*$6,965,534	*11.6	$665,321,374	$717,969,217	*$52,647,843	*7.3
Public pay station revenues	3,457,711	3,988,838	*531,127	*13.3	41,886,866	46,791,122	*4,904,256	*10.5
Miscellaneous exchange service revenues	892,309	934,322	*42,013	*4.5	10,813,307	11,288,532	*475,225	*4.2
Message tolls	18,506,631	23,716,568	*5,209,937	*22.0	238,956,864	301,234,879	*62,278,015	*20.7
Miscellaneous toll line revenues	3,532,664	4,053,069	*520,405	*12.8	43,623,314	48,125,334	*4,502,020	*9.4
Sundry miscellaneous revenues	2,447,463	2,754,411	*306,948	*11.1	30,512,628	33,094,022	*2,581,394	*7.8
Licensee revenue—Cr.	1,050,456	1,239,594	*189,138	*15.3	13,439,700	14,916,468	*1,476,768	*9.9
Licensee revenue—Dr.	1,025,948	1,210,928	*184,980	*15.3	13,124,174	14,515,826	*1,391,652	*9.6
Telephone operating revenues	$81,903,800	$95,483,922	*$13,580,122	*14.2	$1,031,429,879	$1,158,903,748	*$127,473,869	*11.0
Expenses:								
Depreciation of plant and equipment	$15,371,983	$17,462,749	*$2,090,766	*12.0	$194,369,075	$206,086,644	*$11,717,569	*5.7
All other maintenance	13,856,881	17,023,716	*3,166,835	*18.6	166,580,999	184,104,115	*17,523,116	*9.5
Traffic expenses	13,675,677	17,119,461	*3,443,784	*20.1	175,666,713	211,149,537	*35,482,824	*16.8
Commercial expenses	8,011,724	9,587,290	*1,575,566	*16.4	100,005,143	109,163,295	*9,158,152	*8.4
General and miscellaneous expenses	5,259,038	6,340,951	*1,081,913	*17.1	65,953,863	70,710,684	*4,756,821	*6.7
Telephone operating expenses	$56,175,303	$67,534,167	*$11,358,864	*16.8	$702,575,793	$781,214,275	*$78,638,482	*10.1
Net telephone operating revenues	$25,728,497	$27,949,755	*$2,221,258	*7.9	$328,854,086	$377,689,473	*$48,835,387	*12.9
Other operating revenues	$ 45,893	$ 58,345	*$ 12,452	...	$ 899,447	$ 1,152,261	*$ 252,814	...
Other operating expenses	32,686	45,277	*12,591	...	607,267	711,971	*104,704	...
Uncollectible operating revenues	1,353,603	964,280	389,323	40.4	13,572,557	9,406,029	4,166,528	44.3
Operating income before deducting taxes	$24,388,101	$26,998,543	*$2,610,442	*9.7	$315,573,709	$368,723,734	*$53,150,025	*14.4
Taxes assignable to operations	5,847,900	6,983,328	*1,135,428	*16.3	91,322,073	95,624,458	*4,302,385	*4.5
Operating income	$18,540,201	$20,015,215	*$1,475,014	*7.4	$224,251,636	$273,099,276	*$48,847,640	*17.9
Ratio of expenses to revenues, per cent.	68.59	70.73	*2.14	...	68.12	67.41	0.7	...

Comparative Statistics Compiled from 104 Class A Companies' December Reports to Interstate Commerce Commission.

(*Continued from page* 16.)

ating revenues of $38,071,800, down 4.1 per cent from the $40,926,162 reported for 1931. Because of reduced miscellaneous income together with an increase in interest and other charges, the amount applicable to common dividends was short of requirements by $836,868 for the year.

On the year, exchange revenues were fairly stable, but sharp declines were experienced in long distance revenue and in income from investments. In his report, President C. F. Sise notes further economies instituted in the year.

Operating revenues were $38,071,800, against $40,926,162 in 1931. Operating expenses were $29,197,587, against $32,097,577, leaving 1932 operating income at $8,874,213, against $8,828,585 in 1931. Addition of miscellaneous revenue at $783,546, against $1,535,014, made a total income of $9,657,759, against $10,363,599 in the previous year.

After deduction of interest and other charges of $4,916,818, a balance of $4,740,940 remained, equal to $6.16 a share on the common stock, against $7.62 in 1931. Dividends absorbed $5,577,809, leaving a deficit on the year of $836,868, against a deficit a year ago of $297,856.

On the balance sheet, plant investment is shown higher at $192,358,207. Loans repayable in New York funds stand at $12,245,000, against $9,075,000. Total assets are $217,340,210, a new record, against $215,257,603 a year ago. Current liabilities at $16,811,207 exceed current assets of $8,435,861 by $8,375,346.

On February 23 the directors of the company declared a quarterly dividend of $1.50, placing the stock on a $6 annual basis, as against $7 previously.

President C. F. Sise, at a special stockholders' meeting on February 23, immediately following the annual meeting, commented on a new by-law, explaining that the company is planning for this year financing to take care only of the $12,215,000 that has been borrowed from American Telephone & Telegraph Co. to meet interest obligations that have been payable in New York funds. The stockholders at the special meeting approved an issue of $30,000,000 of bonds.

Mr. Sise said that while arrangements for continuing the American Telephone & Telegraph credit were satisfactory, it was desired to discharge this obligation as soon as possible.

"Our plans for the current year do not contemplate construction to an amount in excess of the funds which will be provided by our depreciation and other reserves," he said, "so that any financing which we may undertake will be for the purpose of wiping out these bonds."

Mr. Sise said that effective April 1, all employes will take time off without pay to the extent of at least one-half day every two weeks. During 1932 all salaries and wages were reduced by a total of 10 per cent. To relieve conditions of surplus staff in several departments, the company this year will undertake certain reconstruction and repair work which otherwise would have been postponed.

Indiana Bell Reports 1932 Net Earnings of 4.6 Per Cent.

The Indiana Bell Telephone Co., in its annual statement of operations, reported net income for 1932 of $1,842,042. After paying dividends of $2,650,000, the report shows a deficit of $797,958 charged against surplus. Throughout the year the company was affected by the general recession in business and industrial activities. During the period a total of 53,279 telephones was installed but a total of 85,829 telephones was disconnected, a net decrease of 32,550 telephones in use. The company likewise reported a decrease of 21.3 per cent in long distance calls.

These losses were reflected in a reduction of $1,598,000 in gross revenue for the year, which was placed at $11,275,023. Net earnings were at a rate of 4.6 per cent on the cost of the plant and other assets. Taxes amounted to $1,385,513, or 12.1 per cent of the gross revenue as compared with 11.5 per cent in 1931. The taxes are estimated to amount to 57 cents a month for each telephone in service.

At the close of the year the company had total working assets of $2,272,036.77 and total assets were $51,360,325.67. Telephone plant and equipment were valued at $40,850,194.42. New construction work was confined largely to completing the new office building in Indianapolis and plant replacements.

During the year the company transmitted an average of daily messages of 1,225,543. The number of outward toll messages handled was 5,543,892. The company has 97 central offices and 950 private exchanges. The total number of owned and connecting telephones in operation was 410,847, of which 223,504 belonged to connecting companies.

The company has 8,145 miles of pole lines and 925,706 miles of wire. It employs 1,244 men and 1,842 women, having had a payroll in 1932 of $4,406,086.

Several Associated Bell Telephone Companies Reduce Dividends.

During the past few weeks, several of the Bell associated companies reduced their dividends in line with the reduced revenues due to the loss of thousands of stations last year.

The directors of the New England Telephone & Telegraph Co. on February 21 declared a quarterly dividend of $1.50 a share, compared with $2 previously paid quarterly. Four other associated companies and one affiliated company of the American Telephone & Telegraph Co. had previously reduced their dividend payments.

After the meeting of the New England company, a statement was issued which read in part: "The company started the year 1933 with about 120,000 less stations than it had at the beginning of 1932. Revenues are correspondingly reduced and the directors feel that with the comparatively small surplus which this company has, it is wise to take action at this time that will aid in preserving the continuity of dividends at a somewhat lower rate.

In consequence, the dividend declared is at the rate of 6 per cent per annum."

The New Jersey Bell Telephone Co. reduced its dividend rate from $8 to $7 annually, the Ohio Bell Telephone Co. from $6 to $5 annually, the Michigan Bell Telephone Co. from $4 to $2 annually, and the Chesapeake & Potomac Telephone Co. of West Virginia omitted its dividend. The Bell Telephone Co. of Canada also reduced its dividend rate from $7 to $6 a year.

Based on the number of shares in these companies owned by American Telephone & Telegraph Co., the dividend changes represent a diminished income from this source, on an annual basis, as follows:

	Number of Shares Owned.	Amount of Reduction.
New England....	870,942	$1,741,884
New Jersey.....	1,203,952	1,203,952
Michigan	1,099,886	2,199,772
Ohio	1,299,991	1,299,991
West Virginia.....	162,648	648,000
Canada	187,498	187,498

This is a total reduction of $7,281,097 on a full 12 months' basis in the income of American Telephone & Telegraph Co. from dividends. Income from dividends in 1932 was $137,379,816, which were not fully earned by the companies by an aggregate of $22,400,000. Income from dividends in 1931 was $150,135,884. As a whole, these dividends were earned with a margin of about $3,400,000.

The directors of the Bell Telephone Co. of Pennsylvania declared the regular quarterly dividend of $1.62½ on the 6½ per cent cumulative preferred stock. The dividend is payable April 15 to stockholders of record March 20.

Sale of Amiret, Minn., Properties Approved by Commission.

The joint application filed by August H. Bushman asking for permission to sell all of his physical telephone property, known as the Amiret Telephone Co., Amiret, Minn., to H. L. Jensen and Milton Jensen, has been approved by the Minnesota Railroad & Warehouse Commission.

The properties consist of one 40-jack switchboard complete with all necessary equipment, all poles, arms, hardware and wire connecting approximately 25 subscribers within the village limits of Amiret, and cable, poles, wire, etc., connecting about 35 rural subscribers.

In approving the transfer of property, the commission gave no consideration as to the value, or price, paid therefor.

Value of Bell License Contract Services

Chief Engineer of New England Telephone & Telegraph Co. Testifies at Hearing Before Massachusetts Commission Relative to Application of Services Rendered Under the American Telephone & Telegraph Co. License Agreement

At a continued hearing before the Massachusetts Department of Public Utilities in the pending rate case against the New England Telephone & Telegraph Co., George K. Manson, chief engineer, discussed the value of the services rendered to the New England organization by the American Telephone & Telegraph Co. under the license agreement which collects 1.5 per cent of the subsidiary's revenue for the parent company's charges.

In the 1925 rate case, extended testimony was given by the New England company as to the value of these services, and as the major points are well known throughout the telephone industry, repetition is unnecessary here. In the following extracts from Mr. Manson's testimony, emphasis is laid only upon applications of the agreement which are of interest to executives, engineers and traffic men in particular.

Letters and Bulletins.

Contacts between the representatives of the two companies are matters of daily occurrence, and the witness stated that the letters, circulars, bulletins and other written material received are not merely a compilation of interesting information which is read once and then destroyed. Whether the material is put into practice by the New England company is discretionary with its engineers.

In some cases the material received may describe a piece of apparatus of such limited application in the territory that it would not be worth while to discard the equipment already in use. In such instance, the New England company might or might not inform the Bell company that it had not adopted the suggested practice; but in significant matters reacting on the cost of operating the service, the problems are generally discussed by the engineers of both companies working together.

There were, for example, circulars issued by the A. T. & T. Co. on dial service early in its development, but the New England company began to install this service before equipment specifications came through, and the American company's engineers were in Boston conferring with the local staff and developing the specifications from the practice of the pioneer applications. This has been the case with many other forms and methods. Meritorious developments in the field are passed along to the American company to complete.

The New England company has the right to use every A. T. & T. patent without restriction, and the parent company is obligated to make available all patents that may be useful, from whatever sources and wherever owned. Many savings in operating expenses have resulted.

Commissioner Webber declared that the board is confronted with the single question whether the New England company is paying too much to the A. T. & T. for services rendered the former. W. C. Marshall, for the petitioners, contended that about $250,000 per year would be sufficient compensation to the parent company from the New England. The latter's 1932 license fee, prorated on its Massachusetts business, was $767,000.

Mr. Manson said that the present license agreement is practically the same as that of 1925 as to terms, except for the percentage of gross revenue required and the ownership of the transmitter, receiver and induction coil, which now resides with the New England company. As the system has grown larger and more complex, the parent company's services have also expanded. The New England company would be in very great difficulties today if it had to give up the parent company's services.

The witness declared that Mr. Marshall's attempt to evaluate the services of the A. T. & T. to the New England company by reducing them to an average cost of about $3,000 per letter or circular received, is ridiculous.

The parent company, said the witness, has a broader view on such matters as building design than does the subsidiary, and advises the latter when new construction is contemplated, besides aiding in making fundamental plans for system development. As long ago as 1913 a fundamental plan was prepared for exchange development in downtown Boston. Today the buildings at Bowdoin Square and Harrison avenue house the central office apparatus serving the entire downtown area.

Similar plans are made for every central city, such as Worcester, Salem, Springfield, etc.; and one such plan is now being studied for the Boston North Shore district. The trend is generally toward consolidation instead of decentralization of exchange offices in congested regions.

Development of Carrier Cable System.

Some years ago, Mr. Manson stated, the American company developed the carrier system of multiplex telephony, as a result of which it could get from three to five additional good telephone circuits on a single pair of wires, or as later developed, by two pairs. In this way, out of two pairs of physical wires the company could get two circuits represented by themselves, a third phantom circuit, and three represented by the carrier. The maximum number used so far is five between Boston and New York in one system, i.e., five multiplex circuits in addition to the physical circuits on which they are superimposed.

About 1920 the New England company established a carrier cable system between Boston and Bangor on the strength of this development, which enabled it to cut some of the Boston-Bangor circuits into the Boston-Portland circuits and Portland-Bangor circuits. Traffic began to fall off, and this development enabled the company to postpone work on the new Boston-Portland toll circuit until 1924, bridging the gap of depression in its business. All this was learned through advance contacts with the parent company.

Until now this multiplex system has not been available for cables except theoretically, on account of cost; but the New England company has recently been informed that a carrier cable, so-called, is under way and that a sample is being erected in New Jersey. Mr. Manson expects by the time business picks up and more toll cables have to be installed, it will probably be feasible to use that type of cable, getting more circuits in it by use of the multiplex feature. The maximum number of circuits or extra channels which it is anticipated will soon be obtained over a given group of two pairs of wires is nine, with further possibilities in the future.

Benefits from Research Work.

The New England company benefits greatly from the parent company's researches on the quality of transmission. The former is now reviewing its practices from the standpoint of transmission standards, and advance information from the A. T. & T. has pointed the way toward reductions in cable costs, through the use of finer gauges of wire to greater distances from the central office.

The A. T. & T. Co. did most valuable work in connection with the establishment of the Green Harbor radio telephone station for serving coastwise shipping and land stations. The installation was far more comprehensive as a result of the parent company's cooperation and experience.

In 1931 the New England company installed sender tandem equipment in its Harrison Avenue office at Boston, superseding manual tandem equipment previously located in Milk street. The primary

purpose is to permit trunk lines between offices having too little business with each other to justify direct trunks, to function effectively by using a manual tandem board.

Small groups of trunks are far less efficient than large groups, and the percentage margin of spares is much greater with the former. The groups are consolidated by utilizing the tandem board; and now the sender tandem boards in use contain some of the latest features of the dial apparatus and perform their service much better than did former equipment. Here the parent company did pioneer work and the subsidiary company benefited. The trunks were more efficiently used and service delays prevented.

The New England company is still utilizing the improvements evaluated in the former rate case with the exception of open-wire phantom circuits, which have been cut down by the introduction of cable into toll lines. In 1924 there were 54,000 loading coils in use by the company against 252,000 last fall. In 1924 it had 321 vacuum tube repeaters against 2,804 at the end of 1932.

The design of the loading coil has been greatly improved by the development of permalloy, and a reduced size of coils has resulted. Thus, in one case, a coil can be passed through a standard manhole cover, accommodating an entire loading of 900 pairs of cable for exchange trunks, whereas it would formerly have taken about three such cases to load a full-sized manhole with cables. This means a saving in the cost of coil, casing and handling. The coil itself, not encased, costs about $1.70 against $3.25 for the coil it replaces. While both types of coils have long life, the earlier ones were more easily magnetized by direct current. Some are still in use which were installed about 1905.

The witness estimated that without the loading coil improvements associated with this cable transmission, it would cost the New England company at least $16,000,000 more annually to render the present grade of service. Annual savings from the use of repeaters would be about $900,000, and from fine wire cables in Massachusetts alone, at least $2,000,000. Present savings from the use of antimony in lead sheaths instead of tin, are about $100,000 a year.

Mr. Manson said that he doubted if any patent existed on the use of antimony, but understood that patents exist on phantom circuits, loading coils, vacuum tube repeaters and relays. Commissioner Stone inquired if the company could have purchased these improved materials elsewhere than from the Western Electric Co. The witness said that the company bought some cable containing antimony from another company, but generally such cable was bought at lower prices from the Western company.

Other savings emphasized in the 1925 case included the use of tinsel switchboard cords in place of steel, narrow base keys in "B" positions, electrically-operated message registers in place of tickets used in the manual system on individual measured service lines, the electrical control of pay stations to speed up calls, and the audible ringing signal. All these savings, the witness declared, represent increased economies today over those of 1925.

Counsel Grant, of the New England company, stated that if it were not for the license contract it would be impossible for the company to render the present standard of service and that rates would have to be higher to offset the disadvantages incurred by having no contract with the A. T. & T. Co.

Plant Improvements Since 1925 Case.

Mr. Manson reviewed the improvements in the use of fine wire in cables since 1925, and pointed out that the No. 26 gauge wire is now used in cables as large as 1,818 pairs. Another advance is in the use of sulphite pulp instead of paper tape cable insulation. The saving in cost has been small, but the company is no longer dependent on a form of insulation the supply of which might be interrupted in time of need.

Another gain has been in the development of the treatment of Southern pine timber for poles, meeting a very vital need. The A. T. & T. has played an important part in this work along with others. The chestnut pole has disappeared from the picture on account of blight. The size of telephone sets has also been reduced.

Extra Charge for Handsets Opposed.

David E. Scoll, a resident of Cambridge, appeared before the commission in opposition to the New England company's 25 cents per month extra charge for handsets. He stated that the commission had informed him that there are now 169,554 such sets in use in the New England system, and that these cost $9.05 each against $3.97 for the ordinary desk set. The speaker claimed that $3 per year represents an excessive price for this equipment's rental above the usual station apparatus and declared that it should be reduced.

Commissioner Wells asked it the handset was not comparable to extra fare train service on the railroads, in a sense a luxury which need not be ordered since alternative services without extra cost are available.

Mr. Scoll said that even if the service is a luxury, this is no ground for making the price of it excessive. He said that the commissions in Maryland, the District of Columbia and Virginia have all barred extra charges for handsets, and that the Pennsylvania commission has ordered that the charge be abolished in two years. The company plans to reply to these contentions at a later date.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Wisconsin Commission Considering New Bell Rate Reduction.

Issuance of a new order under its emergency rate powers, to succeed its interlocutory order of last year directing a 12½ per cent reduction in rates of the Wisconsin Telephone Co., is under consideration by the Wisconsin Public Service Commission, it was announced on March 14.

The contemplated order would take effect beginning July 1, 1933, the expiration date of the interlocutory order now in effect.

It was the first time in history of utility regulation in Wisconsin that the commission announced it is considering entry of a rate order.

"Although we are of the opinion that notice to the company of contemplated action under the emergency provision of the statute is not required," stated the commission, "nevertheless in view of the company's position that a failure to give such a notice of contemplated action and hearing thereon works unjustly, we have concluded to furnish such notice with respect to the future, so far as it is now possible to determine our future action."

The commission challenged the company to prove that no emergency existed.

Expressing the opinion that an economic emergency does exist sufficient to permit issuance of an emergency rate order, the commission stated its willingness to grant the company a hearing on this question but "in no way commits the commission to the position that such hearing is mandatory."

Rayburn Bill for Communications and Power Commission.

Chairman Rayburn of the House interstate commerce committee, on March 17 introduced his bill providing for a federal communications and power commission.

He would combine the Federal Radio Commission and the Federal Power Com-

mission into a new commission and transfer to it the Interstate Commerce Commission's present authority over telephone and other kinds of communication.

House Passes Bill Providing Maximum Rates In Minnesota.

A heavy reduction in telephone charges within the Twin Cities was recommended by the telephone and telegraph committee of the house of the Minnesota legislature last week, when it voted approval of a bill by Representative G. W. Johnson, Duluth, which would fix maximum monthly rates for telephone service for the entire state.

The rate for Duluth would be slightly higher than that for St. Paul and Minneapolis. Maximum rates as named in the bill are $5 monthly for one-party business lines; $3.50 for two-party business lines; $2.50 for one-party residence lines and $1.75 for two-party residence lines. The reductions would amount to 50 per cent or more on business telephones and to one-third or more on residence telephones.

Provision, however, is made in the bill that if any of these schedules is deemed unreasonable or confiscatory, the Minnesota Railroad & Warehouse Commission may readjust rates to a reasonable level. Burden of proof in this case is placed on the telephone company, reversing the process now operating under existing laws.

Bill Killed Requiring Companies to Pay Investigation Costs.

The Nebraska senate has killed a bill strongly opposed by telephone companies, which would have required them to pay all expenses of hearings and investigations ordered by the Nebraska State Railway Commission on its own motion or on complaint of others or on application of the company for rate readjustments.

The attorney general was empowered to sue the companies for these expenses, which were to be charged up as costs. The author of the bill said that it had been handed him by outside parties, and did not appear to defend it when the committee called a hearing.

Resolution Filed Asking Rural and Switched Rates Be Reduced.

Allegedly in the interest of continued and uninterrupted service and the restoration of the loss of rural and switched subscribers of the Northwestern Bell Telephone Co., the Nebraska State Railway Commission on March 14 issued an order citing that company to appear March 28 and show cause why the commission should not enter an order reducing those rates in such substantial amount as will retain all of its present rural and switched subscribers and restore a substantial number of those lost to it.

The emergency rate is proposed to be continued for one year, beginning the first day of the month following the entrance of the order, unless continued or sooner modified or revoked by the commission.

The resolution was prepared by Commissioner Bollen, and originally carried a 40-per cent reduction, but other members of the commission held that this would amount to making the order and delivering the sentence before any trial was had. As first given out, the commission was understood to be thinking of citing all companies to appear.

The resolution recites a number of whereases, which included pointing out that in 1931 the number of rural subscribers had decreased from 9,813 rural subscribers and 10,584 switched subscribers to 8,403 rural patrons and 10,251 switched customers. The company's report for 1932 is not yet on file, but the commission says it will show a more sharp decrease.

Complaints now coming to the commission show a continuing loss and the certainty of still fewer subscribers. One petition contained 700 names, and several came from the Omaha territory, where meetings have been held and company representatives heard.

The commission sets out that this extraordinary loss of subscribers is the direct result of the extremely low prices of agricultural commodities and the resulting inability of this class to pay existing rates. It not only represents a substantial loss of revenue to the company, but a substantial loss of service to business and city resident subscribers.

The resolution further recites that the company has ignored the petitions and requests of rural subscribers and the request of the commission itself for a reduction in any reasonable sum whatsoever, while at the same time the company has been paying all operating expenses and making substantial profits, without a reduction in dividends.

It is also set out that the federal supreme

GENIUS OR INDUSTRY

By Miss Anne Barnes,
Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

We often find ourselves envying a friend, acquaintance, or person we read about, who seems to be possessed of a natural endowment for some special pursuit other than industrial work such as we do. After reading an exceptionally well-written story we sometimes exclaim: "How fine it must be to be able to write a story like that!"

We do not associate labor, packed into a definite and regular daily schedule of hours, in connection with such a pursuit. However, a writer of considerable note has stated that the hardest work he has ever done is writing.

A dressmaker takes a piece of cloth, lays a pattern on it and fashions a dress. She has tangible material and a tangible pattern with which to work. She knows, from past experience, about how much time and labor will be required to make a dress.

A writer has in mind a story, an intangible thing, which he plans to transfer from his imagination onto paper. He has no pattern of cut-and-dried methods in which to fit his story, and he observes no particular hard-and-fast schedule of hours while working on his story.

The industrial employe carries out a regular routine of duties through the medium of specified rules and regulations, day by day, usually for an eight-hour period. Each day's work is completed at a certain time.

A writer accomplishes much or little each day, according to his mood. Often, he tears down the work he did yesterday, sometimes for many days back, and makes another start. All is not "easy going" for him. Much is very hard and discouraging. He has no one to depend upon but himself in the progress of his story-writing.

Genius is a most desirable steed. It often carries a person through the long, hard journey into the portals of fame, but not without balking now and then for no good reason at all. The main thing to keep in mind is: Hold on tight, no matter what sort of a mood old Temperamental Genius is in, because, if you do not, you may never finish the journey.

After all, Industry is a mighty good, patient, dependable steed to ride on. It may not bring us into a goal where great acclaim and honor awaits our arrival, but it will bring us all the way without balking.

Be sure you know which steed to take before mounting, then *stick* to the journey's end. Above all things know what you want to do, and are fitted to do, then "Start your cloth—God will supply the thread," said a wise old prophet.

court recently took notice of the depression when, in the Atchison case it held that "this is not the usual case of possible fluctuating conditions, but of a changed economic level," and also that regulatory bodies of other states are ordering general reduction of telephone rates based on the reduced capacity of the public to pay existing rates.

The resolution winds up with this declaration: "In these times the most any business can hope for is revenue sufficient to avoid insolvency and the consequent disintegration of the property. Any rates designed to allow a reasonable return according to 1928 and 1929 standards would only result in a loss of patrons and the corresponding loss of service to the subscribers who still continue the service."

Ohio Company Proposes Cheaper Grade Service; Party-Lines.

The Newark Telephone Co., Newark, Ohio, has applied to the Ohio Public Utilities Commission for authority to reduce rates by furnishing a cheaper grade of service.

The company proposes to inaugurate ten-party line service with a five-minute limit on conversations at a cost of $1.75 monthly; and four-party business service permitting unlimited incoming calls with a charge of five cents for each outgoing telephone call.

Need for Protection Against Claims for Errors in Service.

The need for protection against claims for errors in service was urged on March 15 by officials of the New York Telephone Co. in the hearing in New York City instituted by the New York Public Service Commission into provisions in the tariff schedules requiring the customer to assume liability except in certain cases.

C. C. Johnson, engineer of rates for the telephone company, testified that such protection was justified "because of the inherent character of our business," which "is to furnish the facilities for communication and not to convey messages."

Mr. Johnson said that, in 1932, claims occurred at the rate of about 32 for every 1,000 accounts and had reached a total of some 600,000. These included errors in billing, service interruptions and disputes as to the length of calls.

Information concerning the methods of handling and supervising the calls to avoid errors and to detect the cause of them was given by H. J. Schroll, an executive of the traffic department.

The total number of calls observed by trained members of the staff to check errors in service was given as 1,519,059, and of this total less than one-half were in the manual division of the service. Mr. Schroll testified that there was nothing to show that the company made more errors than the subscriber.

A comparison of the records from 1928 to last year, according to Mr. Schroll, indicated a smaller percentage of errors on the part of the subscriber last year and also that the percentage had decreased with the use of dial telephones. The hearing is scheduled to end on Wednesday, March 22.

Federal Supreme Court Hears Wisconsin Injunction Argued.

Attorneys for the Wisconsin Telephone Co. on March 16 defended in the United States Supreme Court the action of the three-judge federal statutory court which issued an interlocutory injunction against enforcement of a 12½ per cent rate reduction ordered by the Wisconsin Public Service Commission.

Edwin S. Mack, attorney for the company, contended that the commission's order of June 30, 1932, justified the lower court in issuing the decree, as the commission had made no attempt to value its properties before ordering the reduction.

Alvin C. Reis, attorney for the commission, attacked the decree because the lower court had not entered any written opinion in granting it.

Summary of Commission Rulings and Schedule of Hearings.

INTERSTATE COMMERCE COMMISSION.

March 17: The Northwestern Bell Telephone Co. renewed its application for approval of acquisition of the St. Paul, Minn., property and contiguous exchanges of the Tri-State Telephone & Telegraph Co.; also several through toll lines.

April 13: Hearing in Washington, D. C., on complaints of state commissions relative to the revised accounting system of the Interstate commission.

This hearing was ordered to afford an opportunity to representatives of the state commissions, telephone companies and others having a direct interest in the accounts of telephone companies, to present testimony regarding any particulars wherein it is contended that the rules in the uniform system of accounts for telephone companies, first revised issue, effective January 1, 1933, are defective.

CALIFORNIA.

March 8: Elizabeth Grigsby and Clarice Wood, owners of "Volcano Telephone Lines," filed application asking authority to sell the system to W. Gilman Snyder of Jackson. The property serves communities in vicinity of towns of Pine Grove and Volcano, Amador county, and West Point and Railroad Flat in Calaveras county, and extends to Mokelumne Hill, Calaveras county.

March 10: The Manteca Telephone Co. filed application to renew note and deed of trust for $4,000.

ILLINOIS.

February 28: Special permission granted application of the Boone County Co-Operative Telephone Co. to publish on less than statutory notice, effective March 1, 1933, rates and rules for telephone service at Caledonia and vicinity stated in rate schedule I. C. C. No. 2, sheets 1 and 2, attached to its application.

March 2: Order approved authorizing the Illinois Bell Telephone Co. to purchase, take, receive and own 4,960 shares of the common capital stock of the DeKalb-Ogle Telephone Co.; from Mary E. Wetzel, 1,500 shares at $10.00 per share; from William M. McAllister, 460 shares at $10.00 per share; from William W. Joslyn, 1,000 shares at $10.00 per share; and from J. C. Joslyn, 1,000 shares at $7.00 per share.

March 2: Request granted of the Intra-State Telephone Co. to waive service connection charges, and move and change charges for a period of three months beginning March 1, 1933.

March 2: Request granted of The Northwestern Telephone Co. to waive the service connection charges at all its exchanges from March 1 to May 31, 1933.

March 2: Schedules presented on which no action was taken by the commission:

Farmers Fountain Telephone Co.'s I. C. C. 5, covering telephone service applying to Columbia, Waterloo, New Hanover and Valmeyer, and vicinities, Monroe county, effective April 1. Rates for city individual line and rural multi-party business stations are reduced $3.00 per year. Rates for city multi-party residence and rural multi-party residence stations are reduced $1.80 per year.

Southwestern Bell Telephone Co.'s I. C. C. No. 2, covering general toll traffic applying in Illinois, effective March 18.

March 8: Special permission granted application of the Farmers' Mutual Telephone Exchange Co. to publish on less than statutory notice, effective March 1, 1933, rule establishing monthly billing periods for city subscribers at Alexis.

March 21: Hearing in Springfield before Commissioner Byrne on complaint of the Farmers Fountain Telephone Co. against the Harrisonville Telephone Co. as to delivery of public toll service to the Maeystown Telephone Co., not incorporated, over a rural subscribers line owned by the Harrisonville Telephone Co. extending from its Waterloo exchange.

March 23: Hearings in Springfield on applications filed by the Illinois Bell Telephone Co. for authority to lease certain telephone facilities, power and floor space in Danville, from the American Telephone & Telegraph Co.

March 23: Hearings in Springfield on applications filed by the Illinois Bell Telephone Co. for authority to lease certain telephone facilities, power and floor space in Waukegan, from the American Telephone & Telegraph Co.

March 23: Hearings in Springfield on application of the Illinois Bell Telephone Co. asking for authority to lease certain telephone facilities, power and floor space in Decatur, to the American Telephone & Telegraph Co.

LOUISIANA.

March 28: Hearing in Lake Charles on complaint of citizens of Washington against the rates of the Louisiana Telephone Co.

MASSACHUSETTS.

March 28: Continued hearing in Boston in rate investigation of the New England Telephone & Telegraph Co.

MINNESOTA.

March 7: New Ulm Rural Telephone Co. authorized to grant its patrons at New Ulm an additional emergency discount of 25 cents a month on all gross telephone rates, but not on net rates. The commission's order becomes effective, April 1, and continues for one year, until April 1, 1934.

The emergency discount means a 50-cent

(*Please turn to page 36.*)

THE ROMANCE OF
THE TELEPHONE
RECOUNTED

For future subscribers

AN ADVERTISEMENT
OF THE AMERICAN
TELEPHONE AND
TELEGRAPH COMPANY

THERE'S plenty of romance and adventure in the telephone business. Mature minds may take it for granted, but youthful imaginations can be stirred. And the young owners of those imaginations will be founding homes, entering business and needing telephones within a few years.

To reach this important, potential market—to win its friendly interest for the telephone—advertisements like the one at the right run regularly in a number of juvenile publications. Each describes an interesting episode in the maintenance and extension of telephone service. Each is written as carefully as the fiction stories and articles in the same magazines.

Such advertising, appearing month after month, year after year, should make both friends and prospects for the entire telephone industry.

HOW AIRPLANE CAMERAS "*Break trail*" FOR THE Telephone

How the ground looks from 13,200 feet. One of 220 aerial photographs covering a hundred-mile strip. The black line at the left marks the proposed route of the telephone line.

A BIG cabin monoplane is on the field, warmed up, pilot and cameraman in their places. With a sudden deepening of the motor's roar, the plane taxies into the wind and sweeps aloft into the clear morning air. A new telephone cable line is being surveyed. And an important part of the job is to map the route from the air for a hundred miles across country.

As the plane approaches the beginning of the route, the pilot lifts her nose to 13,000 feet, then levels out and takes a straight course over the proposed right-of-way. The big mapping camera in the floor of the fuselage is mounted on an axis, so that it can be held horizontal to the line of flight and parallel to the ground. At regularly timed intervals the cameraman snaps a photograph of the country beneath, and each picture he takes overlaps about 60% of the ground covered by the previous shot. Thus adjoining pictures can always be identified.

The photographs taken from an altitude of 13,200 feet show the ground on a scale of 1320 feet to the inch. By flying lower and taking more frequent shots, the scale can be made larger if necessary.

Aerial photographs not only show the exact location of roads, houses, fields and woods, but give a very accurate idea of contour—the hills and valleys, swamps and watercourses along the route.

They enable telephone engineers to lay out the path of a pole line or underground cable so that there will be little interference with buildings or cultivated fields. And in wild country, where roads are few, air pictures save weeks of tramping over the ground on foot.

In line with its policy of using proved inventions that can contribute to increased efficiency, the Bell System employs airplanes in making its pole line surveys wherever their use is justified. It is due to modern methods, standardized throughout the country, that the Bell System has been able to expand and improve your telephone service year by year.

A BELL SYSTEM ADVERTISEMENT

Outside Plant Men Talk Things Over

Accidents Cause Humans Needless Sorrow, Grief and Expense.

By Jake the Lineman.

Mornin' buddies! Last night I was a' sittin' in my easy chair, smokin' my ole corn-cob pipe and jist sort of relaxin,' as I watched the flames play in the fireplace. As I sat there, a' puffin' an a' thinkin', an idea crept into my mind an' hanged if I can rest 'til I git it out.

We all know that Ole Man Accident has been a' knockin' us humans for a flock of tombstones at the rate of about 95,000 per year, permanently injurin' approximately 345,000 annually, and temporarily disablin' perty nigh 9,000,000 folks every year. The average annual cost of accidents is aroun' $2,305,000,000 which takes in medical expenses, wage loss and the overhead of insurance.

Judgin' from the foregoing figures it 'pears as though any plan, which would help reduce the large number of deaths and the tremendous number of injuries caused by accidents and thus lower the cost of accidents, is worth considering.

We have a large number of buddies who have gained a considerable amount of benefit from our safety classes. The rules, and ideas, brought out each Saturday, have made them more safety-conscious and, as a result, they have become less susceptible to accidents. Many of our buddies have passed our safety rules on to their fellow-workers, relatives, acquaintances and friends and thus have helped the cause of safety, and it's impossible to help safety without giving Ole Man Accident a bad headache.

Why can't this throng of safe-minded telephone workers be joined together in a safety organization, created to thoroughly acquaint all members with every phase of safety as applied to telephone work; to instill in their minds a deeper appreciation of good health and instruct them on how to obtain and maintain good health; to educate them in all forms of first aid so that they may be thoroughly prepared for any emergency and thus make them more valuable and helpful as employes and as citizens?

Imagine, the results which could be accomplished in your organization, if you and your fellow workers were members of a national telephone workers' safety club, holding regular employes' safety meetings, taking up material forwarded from this office and dealing with safety, health, first aid and accidents.

A safety organization, such as can be organized, if sufficient support is given, would give every member:

Thorough instruction bulletins, letters, and safety signs prepared and forwarded by my office.

Safety rules, pointers and suggestions for every part of his or her work.

Seasonal health suggestions.

First aid instruction.

Advice on any matter relating to safety, health practices or first aid.

Information regarding safety equipment and materials.

Recognition and awards for helpful services rendered to the public.

Pins or other awards for "No-Accident Records."

Well, what do you say, Buddy? Can we count you in? As a member of the large Safety Club, which I hope to have organized before long, you would be learning valuable things, and thus would be helping to completely eradicate Ole Man Accident from the face of this earth. You'd like to help do that, wouldn't you? Well, send in the accompanying coupon or a memo giving me your name and address, and then, if we get enuf response, we'll have one of the liveliest, and most interesting clubs goin' 'fore many more days pass.

Fill out the coupon and shoot it into me at once, so that I'll know whether to go ahead with my plans or not. We'll need lots of support so if you're interested, don't fail us. Send the coupon in and if the club is a "go" you'll be repaid a thousand times.

Well, I guess that's enuf information about the club for right now, so I'm just gonna tell you a little joke I heard the other day. It went somethin' like this:

The teacher was practicing "word usage" on the students.

"Johnnie," she said, "give me a sentence using the word diadem."

For a second Johnnie was a puzzled boy and then he said:

"People who are careless diadem sight sooner that folks who are careful."

Johnnie shure smacked the nail right on the head with his statement. It might have been wrong so far as the teacher was concerned but it's shure correct when it's applied to careless folks.

Folks are even careless when it comes to cuts and lacerations for it's been figured that one-sixth of all cuts and lacerations, resulting from accidents, become infected. Why do they become infected? Simply 'cause folks are careless 'bout cuts an' scratches. They ignore them, or regard them as harmless, an' then when they wake up with an infection, they wonder why.

Buddies, take care of such things. Don't allow a little cut to become a big infection. Prevent such occurrences by applying iodine to the cut or scratch. Remember, it's a lot better to pour on the iodine than to have someone throw dirt in your face. Nuff sed!

Guess I'll be ramblin' but I'll be back Saturday, so be on hand! Send your clipping in real soon.

During the week carry this thought around with you, "We live only once, so why not live safely?"

Dear Jake:
I think your plan for a Telephone Workers' Safety Club is.....
Let me hear more about it.
Name .....
Address .....
Company .....

Ernest S. Hymus, Toronto Division, The Bell Telephone Co. of Canada, Is One of the Five Winners of the Safety Test Recently Given. He Has Been Employed by the Bell Company for the Past Seven Years.

Wire Net Protects Long Distance Lines from Quarry Blasts.

An enormous "birdcage" enclosing telephone wires is the wonder of travelers along Oregon's lower Columbia River highway, near Rocky Point.

Bombardment of rock fragments blasted from a nearby quarry sheared off many long distance lines linking Astoria and Portland, until engineers of the Pacific Telephone & Telegraph Co. devised a novel netting of heavy wire to ward off the unusual barrage. The cage is more than one-eighth of a mile long, and 24 feet wide at most points.

The high velocity of stones hurled by quarry blasts is proved by deep dents in all sections of the netting, which warded off the flying fragments.

A BATTERY THAT'S BUILT TO LAST

Year in and year out Exide Chloride Batteries are widely used in every kind of telephone service

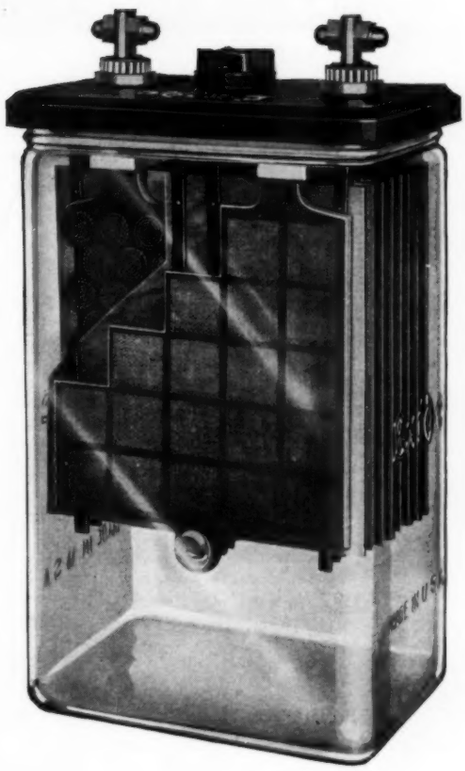
The real test of a telephone battery is performance. Not the performance of one or two years—but of many years. The Exide Chloride Battery is built for long, dependable service. Consider its record of performance . . . convince yourself that it will materially increase the service you get from dollars spent for batteries and battery operation.

Buttons of pure lead pressed into heavy Manchester positive plate grids give the Exide Chloride Battery its tremendous reserve power, and add years to its serviceable life. These additional years of dependable service result in *real* telephone battery economy.

There is no other battery like the Exide Chloride Battery. The unique design of its famous Manchester positive and Box negative plates, its new dowel type separators and its sealed glass jar assembly minimize maintenance, promote freedom from trouble and assure economical operation.

Whether the work is heavy or light; whether the battery is floated or cycle charged; in fact, wherever the utmost of dependability, long life and freedom from care are determining factors Exide Chloride Batteries are invariably used.

Exide Chloride Batteries have proven their merits during 38 years of service covering every kind of telephone battery application.



Exide

BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

Exide Batteries of Canada, Limited, Toronto

When communicating with the Electric Storage Battery Co., please mention TELEPHONY.

NEW LEEDS TRUNK EXCHANGE

THE City of Leeds is situated approximately in the telephonic and geographical centre of Great Britain, and has always been one of the largest and most important trunk centres in the country.

The large extension to the Leeds Trunk Exchange, which we have just installed, is equipped with the latest design of circuits and apparatus specially developed by the British

Post O ng up
This e rovidin
as "De Yorkin
of its h lled i
The e prises
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SIEMENS BROTHERS & CO., LTD

Representation Abroad: Melbourne, Sydney, Brisbane, Adelaide, Newcastle (N.S.W.), Johannesb de Janeiro, Buenos Aires, Colombo, Shanghai, Tientsin, Harbin, Moukden, Cairo, The H apore,

General Post Office, Leeds, housing the new trunk exchange

Post O… ng up long-distance traffic.

This e… oviding the service known as "De… Working" is one of the first of its k… alled in Great Britain.

The e… prises 4 separate switch-boards … of 87 operators' positions.

It is in… same building as the original tr… which was completed by us in l…

SIEMENS
TELEPHONE EXCHANGES

TD … OOLWICH, LONDON, ENGLAND

…S.W.), … hannesburg, Cape Town, Port Elizabeth, Durban, Winnipeg, Calcutta, Bombay, Madras, Rio The H… apore, Penang, Ipoh, Kuala Lumpur, Malacca, Malta, Siam, Wellington, Auckland, etc.

When communicating with Siemens Bros. & Co., Ltd., please mention TELEPHONY.

"Demand Trunk Working" in England

Description of Equipment for Handling Long Distance Calls, Installed in Post Office Exchange in Leeds, England—Method Used Is Similar to the CLR Method in the United States—Operating Features of the Equipment

By R. S. Osborne,
Siemens Brothers & Co., Ltd., Woolwich, London, England

We are indebted to the engineer-in-chief of the British Post Office for permission to give a short description of an equipment which has been installed at Leeds, England, in connection with the method of handling long distance trunk traffic known as "demand trunk working." This equipment embodies the circuits and apparatus which have been developed by the British Post Office for speeding-up the trunk traffic, and is one of the first of its kind to be installed in this country.

In the operation of the scheme hitherto in general use, the subscriber requiring a trunk call was put through to a record operator, who took particulars of the call and asked the subscriber to replace his receiver after having told him he would be rung when the call matured. The record operator then passed the ticket, giving particulars of the call to an operator who was dealing with the trunk lines over which the call would have to pass. This operator completed the calls in the order in which the tickets were received.

Owing to the limited number of trunks available to each operator, delay in completing the calls frequently arose. With demand trunk working, which is similar to the combined line and record method familiar in America and Canada, the subscriber will be connected to an answering equipment on the demand trunk positions. As these equipments are multipled throughout the board, any operator who is free will answer, take particulars of the call and ask the subscriber to hold the line. She will then proceed to set up the call over an idle line in the outgoing trunk multiple.

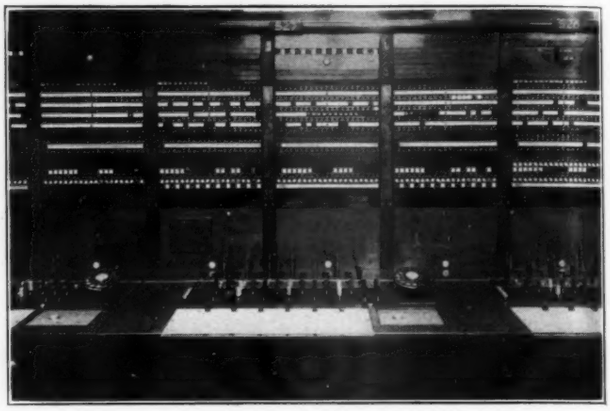

Fig. 1. Close-Up View of One of the Positions of the Island Suite.

If all the trunks giving direct access to the required exchange are engaged, the operator will set up the call to the wanted exchange by an alternative route through any of a number of other trunk exchanges; for example, if a call is required between London and Bristol and all the direct lines are engaged, it can be connected via Birmingham, if this exchange has a Bristol trunk free.

The city of Leeds is situated approximately in the telephonic and geographical center of Great Britain and, apart from London, is one of the most important trunk centers in the country. The switchroom at the trunk exchange already had a total of 105 positions before the introduction of demand trunk working. This scheme has necessitated the exchange being extended by the addition of four entirely new suites of boards, three of which have just been completed, while the fourth is in process of installation.

The three new suites already installed consist of the "Island Demand suite" of 30 positions, the "Incoming and Through suite" of 12 positions, and the "Demand and Delay suite" of 15 positions. It is anticipated that the number of demand positions will be increased ultimately to 130 and the incoming and through positions to 42. Both the original suites and those for the extension were manufactured and installed by Siemens Brothers & Co., Ltd., Woolwich, England.

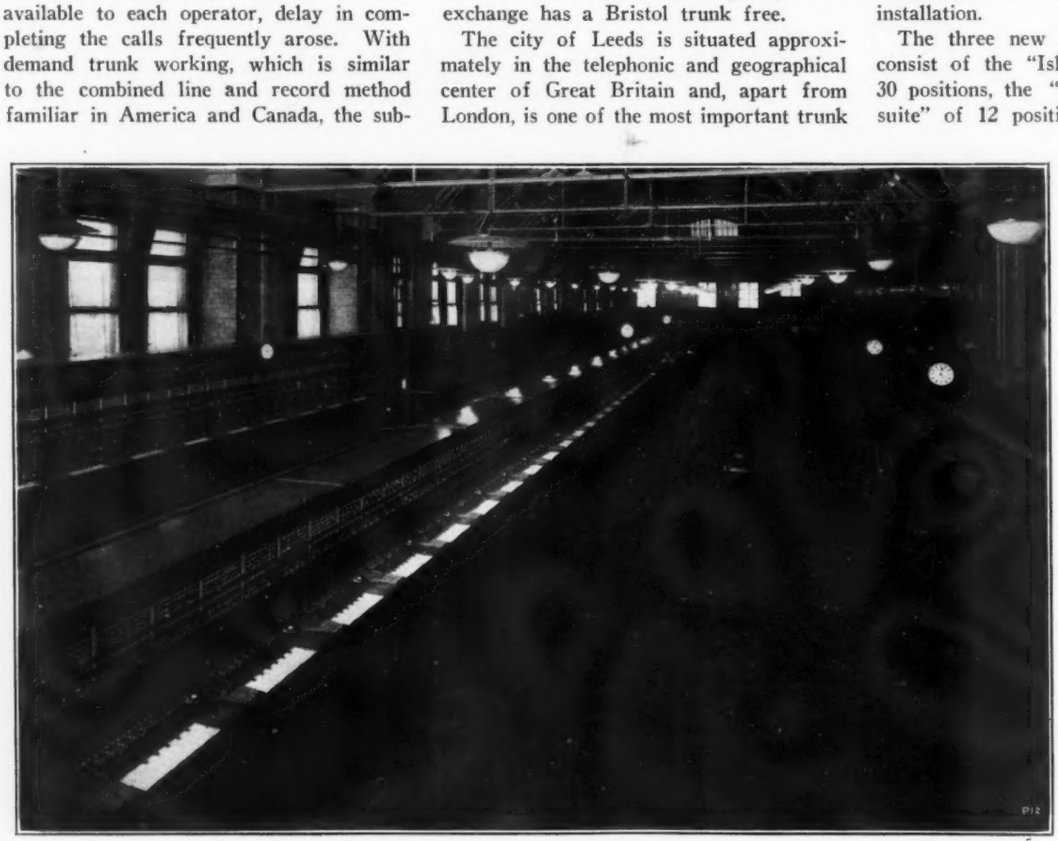

Fig. 2. General View of Long Distance Operating Room in the Leeds, England, Exchange.

The sections are of the new standard design, each having seven panels for equipment and three operators' positions. These positions are each 27 inches wide and provide ample writing space and accommodation for routing bulletins and index files containing tariff information as shown in Fig. 1. The

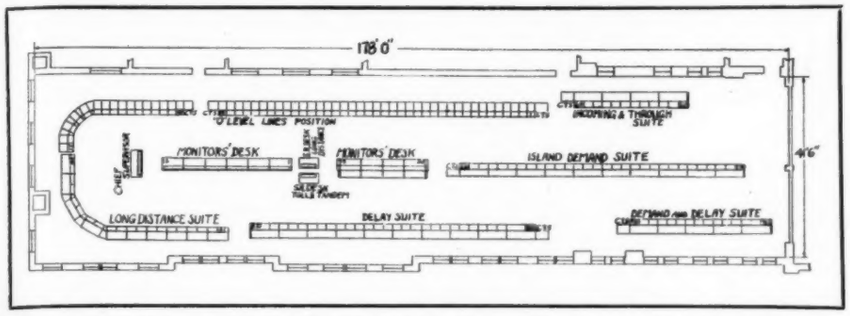

Fig. 3. Floor Plan of Operating Room Showing Arrangement of the Various Switchboards.

multiple cables are supported on horizontal pins, and the usual connecting rack at the rear of the section has been replaced by terminal strips mounted vertically between the positions.

The sections are of different heights, those in the demand and delay and in the incoming and through suites being 6 ft. 4½ ins., and those in the island demand suite 4 ft. 6 ins. The height of the latter has been limited in order to reduce to a minimum the obstruction of the view between the two other suites.

Fig. 2 shows a general view of the switchboards and gives some idea of the size of the switchroom. On comparing this photograph with the floor plan, Fig. 3, it will be seen that the demand and delay suite is on the left and the incoming and through suite on the right, with the island suite in the middle.

At present there are 200 outgoing trunk lines equipped, and these are multipled over all the suites as a six-panel multiple. The usual visual engaged lamps which indicate when any line is in use, have been discarded in favor of a scheme known as "visual idle indicators."

Under this system the trunks are split up into groups, each trunk jack having a lamp fitted immediately above it. If all the trunks in a group are free, the lamp associated with the first one is made to glow. When this is taken into use, its lamp is extinguished and the one associated with the second trunk is illuminated, and so on.

When more than one trunk is idle, only the lamp over the first free circuit in the group is allowed to glow, and in no case is there ever more than one lamp alight in the same group. If through breakdowns or for any other reason a group of trunk lines cannot accept traffic on a "demand" basis, a control key is thrown by a supervisor to light a lamp immediately preceding each appearance in the multiple of the particular group affected. This warns all the operators that calls over that group will be delayed.

The present standard practice has been followed in lighting the idle trunk indicating lamps in the multiples by alternating current obtained from the supply mains instead of by direct current from the exchange batteries. This relieves the batteries of a fairly heavy and continuous load and effects an economy in the cell capacity required.

The voltage is stepped down from that of the supply mains to six volts by means of the transformers shown at the bottom of each rack in Fig. 4. The racks shown in this illustration are known as "A. C. lamp relay racks" and accommodate the relays for controlling these lamps. The sizes of the various junction groups are adjusted by means of jumpers run between the terminal strips below each set of relays.

The jacks and lamps for the answering equipments are multipled over the suites, there being at present 360 of these circuits. They are brought out of the switchboards as two separate seven-panel multiples, one serving the odd positions and one the even, but they are commoned at the intermediate distributing frame by means of tie cables to form a single seven-panel multiple. Facilities have been provided on the intermediate distributing frame for converting these two multiples into one of 14 panels, should this be necessary at some future date.

Although the lamps for these circuits consume a considerable amount of current, it is at present the practice to feed them from the exchange batteries rather than from outside alternating current mains, for a failure in the supply for these lamps would cause a complete stoppage of calls requiring connection to trunk lines.

To facilitate the timing of calls, a special feature known as a "chargeable time indicator" has been introduced. This apparatus has been developed by the British Post Office for use in connection with demand trunk working, and each operator's position is fitted with one of these indicators.

Associated with each cord circuit is a chargeable time indicator key, which, when the call is set up, is thrown by the operator into the "Time Start" position where it locks and connects the six seconds' pulse lead from a master clock to a rotary type of switch associated with that particular cord and key. This switch is driven forward one step every alternate pulse and

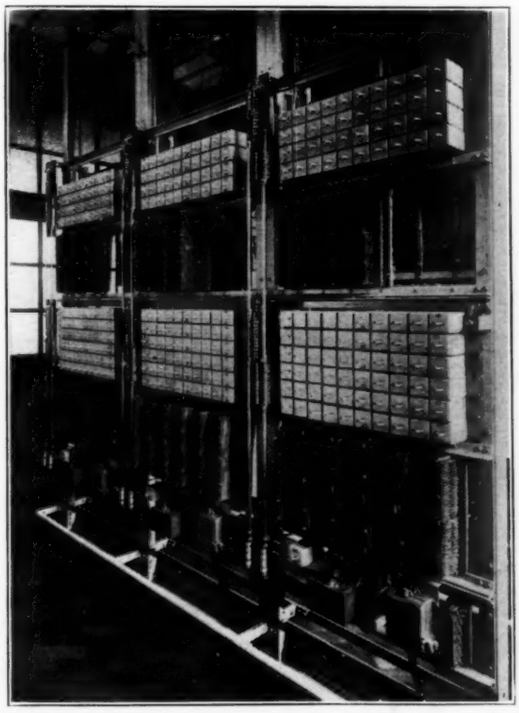

Fig. 4. The "A. C. Lamp Relay Racks" Which Accommodate the Relays for Controlling the Idle Trunk-Indicating Lamps—Fig. 5. Trunk Test Rack Which Takes the Place of Test Desks.

The modulated wave would be radiated from the antenna in the same manner as the unmodulated wave. If a receiving antenna is erected and connected to a vacuum tube as shown in Fig. 3 and a modulated signal "tuned in," and if the tube is operated with a grid bias of such value that the plate current variations are directly proportional to the grid voltage variations, then such a signal *cannot be heard* in the head telephones connected in the plate circuit.

This is due to the fact that the received signal picked up and impressed on the grid circuit, sets up a high-frequency, alternating current in the plate circuit which, being alternating in character, is vibrating at such a rapid rate that the mechanical inertia of the receiver diaphragm prevents it from following the high-frequency variations. Even if it

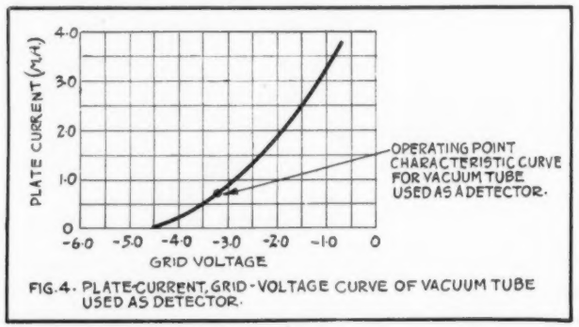

FIG. 4. PLATE-CURRENT, GRID-VOLTAGE CURVE OF VACUUM TUBE USED AS DETECTOR.

were possible for the receivers to keep up with the frequency of the impressed wave, it would still be impossible for the human ear to detect the audio components present in the modulated radio-frequency wave because of the inertia of the average human ear which prevents reception of sound having frequencies much in excess of 16,000 cycles.

If, however, the grid bias voltage is changed to such a value *that the tube is operated on the lower bend of its grid-voltage, plate-current characteristic curve* as shown in Fig. 4, and the modulated radio-frequency signal impressed on the grid circuit as just described, *it will then be possible to hear* in the audio-frequency circuits, the audio-frequency portion of the modulated wave.

Operation of a Detector; C Battery Method.

The "demodulation" or detection of the modulated wave results from the fact that the negative portion or half-cycle of the incoming wave is cut off, or in effect suppressed, due to the non-linear characteristic of the grid-voltage plate-current curve at the operating point. In other words, if the grid bias is such that the tube operates on the lower bend of its characteristic curve, and if the grid is made more negative due to an impressed signal, very little reduction in plate current occurs.

However, if the grid is made more positive, a considerable increase in current takes place; therefore, the negative half-cycle of the carrier wave is, in effect, suppressed. Inasmuch as the head telephones in the plate circuit will respond only to the average variation in voice frequency, the voice component of the modulated wave would be translated into audible speech or music as the case might be. Fig. 4 illustrates the rectifying action of the three-element tube when operated on the lower bend of its characteristic curve.

It is interesting to note what happens when receiving an unmodulated carrier wave. In this case the detector merely serves as a rectifier and the average current flowing in the plate circuit is increased during the time that the carrier is impressed on the grid circuit. The only sound heard in the receiver connected in the plate circuit, is a click at the time the carrier is first impressed and again when it is cut off.

Grid Leak, Condenser Detection.

Another method used in the detection or demodulation of radio-frequency signals is known as the "grid-leak, condenser method." This method is somewhat more sensitive than the "plate-circuit detection method." However, it is much more apt to distort a received signal and is not as popular at the present time as it was some years ago when it was necessary to incorporate as much sensitivity in the detector as possible.

The operation of the plate-circuit detection method was explained by means of the grid-voltage, plate-current characteristics curve. With the grid-leak, condenser method, the detection action is explained by reference to the grid-current, grid-voltage curve. Fig. 5 shows the basic circuit employed in the grid-leak, condenser method.

It will be noted that this method differs from the plate-current method primarily in the use of a low-capacity condenser (usually .00025 m.f.) shunted by a high-resistance

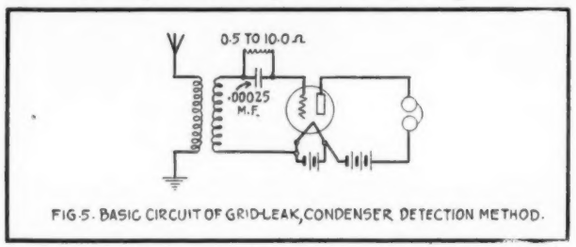

FIG. 5. BASIC CIRCUIT OF GRID-LEAK, CONDENSER DETECTION METHOD.

grid leak which is placed in series with the grid circuit. With this method the grid-return wire is connected to the positive of the filament rather than the negative. The grid-leak, condenser method operates as follows:

When the incoming modulated radio frequency signal is impressed across the grid circuit, the grid voltage varies in synchronism with the impressed signal in the usual manner.

The variation in grid voltage results in a change in the small current flowing in the grid circuit.

The normal grid bias depends on the point at which the grid return is connected in the circuit and the value of the grid-leak resistance. If the grid return is connected to the positive end of the filament, and if a grid leak having a resistance of several million ohms is used, the tube will operate on the lower bend of its grid-current, grid-voltage curve, as shown in Fig. 6. (This curve shows grid current in micro-amperes and grid voltage in volts.)

It is obvious from inspection of this curve that the grid current will increase a greater amount when the grid is positive, than it decreases when the grid is negative. The

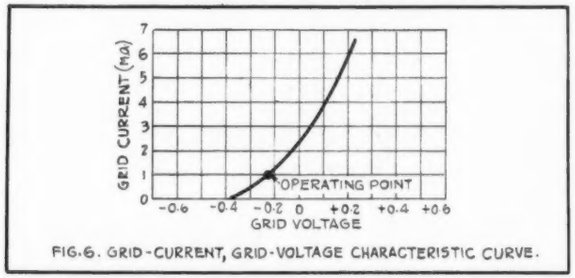

FIG. 6. GRID-CURRENT, GRID-VOLTAGE CHARACTERISTIC CURVE.

radio-frequency input signal, therefore, results in an average increase in the amount of current flowing in the grid circuit.

Inasmuch as this grid current must flow through the grid leak in order to get back to the filament, there is an increased drop in potential across the grid leak; and a greater negative grid bias is, therefore, automatically supplied to the grid when a modulated signal is impressed across the grid circuit. The effect of this increase in negative bias is to cause a decrease in plate current. The plate current, therefore, varies in accordance with the audio-frequency variations in the impressed modulated radio signal.

Briefly summing up the action of the grid-leak, condenser method of detection, we may say that it is a method whereby the normal grid bias is automatically increased when the impressed signal voltage is made less negative, and decreased when the input voltage is made more negative. It will be observed from Fig. 6 that the plate current wave is an exact replica of the modulated variations in the grid-voltage wave.

In order that the signal be not distorted in passing through the detector, it is highly necessary that the grid bias and plate potential be so selected that the tube operates on a straight portion of its plate-current, plate-voltage characteristic curve, and on the lower bend of its grid-current, grid-voltage curve.

continues to drive until the C. T. I. key is restored to its central position. When this takes place, the switch stops and lights a lamp connected to the particular contact on which the wipers are standing.

A set of these lamps forms part of the panel equipment of each position and is fitted behind a translucent designation strip marked 1, 2, 3, etc., to 18. The particular figure illuminated indicates the number of minutes which has elapsed since the commencement of the call.

In addition to the lamps in the panel, which are common to all cord circuits on the position, each cord circuit has a lamp individual to itself. This lamp is lit for a short period every three minutes to draw the operator's attention to the end of each period of chargeable time, and is made to flash after the call has been in progress for 18 minutes so that the operator may note the fact and reset the mechanism to cover a further period of 18 minutes.

In Fig. 1 is given a close-up view of one of the positions on the island suite. The strip of chargeable time indicator lamps just referred to is situated immediately over the docket boxes in the panel. On the key-shelf will be seen the glass bulletin holder and the clips for holding tickets while a call is in progress.

The dial and the base on which it is mounted will be replaced by a set of digit keys for use when voice-frequency signaling is introduced. The piece of apparatus immediately in front of the dial is a valve giving entry to a pneumatic tube, through which the tickets are passed, via a central distributing point, to other suites.

It has been found necessary to provide a completely new and separate room for the accommodation of the frames and racks associated with the additional suites, as the number of racks required was very much more than could be accommodated in the existing apparatus room.

The switching principles of the scheme dis-associate all signaling apparatus from the termination of the line, the cord circuits being of a simple character without signaling apparatus associated with the talking circuit. The terminal equipments, known as relay sets, have been mounted on racks on a jack-in basis in a similar manner to the selector and relay units used in step-by-step automatic exchanges. Seventeen of these racks, each 8 ft. 6 ins. high, were required to accommodate these relay sets.

The testing equipment has been mounted on racks—a practice which is now superseding the former one of providing test desks. A view of this trunk test rack is given in Fig. 5. It will be noticed that the patching cords are fitted in a canopy above the jack field, thus assuring uninterrupted access to the testing keys and instruments, irrespective of the number of lines which may be plugged up at any one time. The small panel towards the far end of the rack accommodates a motor-driven megger.

The original trunk exchange at Leeds is a 24-volt system, but the new demand equipment utilizes 50 volts. To provide this, duplicate 25-cell batteries having an ultimate capacity of 2,800 ampere-hours have been fitted. These will be charged by duplicate motor-generators, each having an output of 400 amperes.

Australia Will Not Furnish Handsets; Subscribers Buy Them.

The Postmaster-General of Australia has announced that, owing to the large stock of standard "pillar" type of instruments now on hand, the new handset type will not be supplied until this old stock has been depleted. Arrangements have been made, however, whereby subscribers desiring the handset types may purchase them from manufacturers approved by the Australian Telephone Administration.

All such orders must be made through the telephone administration, which will maintain the same supervision of installation and maintenance over the handset type as it does over its own standard instruments.

Girls Desired for Night Telephone Operators in England.

Because they are "undoubtedly superior," girls have been asked to take the telephone operators' shift in the evening as well as the daytime in the London, England, exchanges, according to recent press dispatches.

Sir Kingsley Wood, Postmaster General, has asked the girl operators to volunteer for evening duty between 8 and 11. Men have hitherto operated during these hours, but universal complaints of tardiness and careless service have resulted in the requested change.

Although extra pay has been offered to the girls they have, through their union, refused to countenance the proposal because they fear it will cause the men to lose their jobs. Besides, they declare, "We want our evenings for our own pursuits."

OKLAHOMA HOLDS ITS ANNUAL CONVENTION.

(*Concluded from page* 11.)

lems and urged the use of every approach to the public, mentioning the press, bill inserts, and personal contacts of employes. He explained the restrictions on telephone business by which the public is protected against excessive earnings, and explained that the average return from telephone operation at this time cannot be more than fair.

He stated that economies in operation, due to reduced commodity prices, were less in the telephone business than in business generally, such economies being more than offset by increased taxes and decreased revenues. He presented figures showing that in 20 years, the cost of Oklahoma state government had increased 500 per cent and in 1931, governmental costs in Oklahoma, including federal, exceeded the value of all cotton, wheat and oil produced in Oklahoma.

Prices in the Metal Markets.

New York, March 20: Copper—quiet; electrolytic spot and futures, 5½ to 5¾ cents. Tin—Barely steady; spot and nearby, $24.10; future, $24.25. Iron—Dull: No. 2, f. o. b. eastern Pennsylvania, $12.50; Buffalo, $14.00; Alabama, $10.00 to $11.00. Lead—Steady; spot New York, 3.35 cents; East St. Louis, 3.22 cents. Zinc—Steady; East St. Louis spot and future, 3.15 to 3.20 cents. Antimony—6.15 cents.

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WHAT THE COURTS AND COMMISSIONS ARE DOING.

(*Concluded from page 25.*)

reduction from the gross rates affecting regular telephones in city residences, business places, and farm homes. Where the gross rate on one-party residence lines has been $1.75 per month, with a 25-cent discount, if the bill is paid on or before the 15th day of the month, in which the service is rendered, the new charge will be $1.75, with the same 25-cent regular discount, and a special emergency discount of 25 cents, making a net rate of $1.25.

MISSOURI.

March 7: Complaint filed by E. G. Beye, et al. against Middle States Utilities Co. asking adjustment of telephone rates at Blythedale.

March 13: Complaint dismissed of T. S. Dennis and Elmer Wadsworth against the Huntsville Telephone Co.

March 18: Joint application filed by The Neighbors Liberal Telephone Co. for permission to sell and the Inter County Telephone Co. to purchase the telephone utility at Amity.

NEBRASKA.

March 16: Citation issued to Central Nebraska Telephone Co. directing it to show cause on or before April 7 why it should not reduce rural exchange and rural switching rates.

March 16: In the matter of the citation directed to all telephone companies ordering them to show cause why monthly reports should not include certain data relating to assets and other statements of condition, order entered continuing matter for 30 days.

March 17: Petition filed by subscribers of the Havana Telephone Co. at Indianola and Stockville exchanges requesting reduction of 25 per cent in rates.

March 17: Application filed by the Farmers' Telephone Co. of Dodge county requesting authority to waive installation charges for a period of one year at its North Bend, Snyder, Webster, Dodge and Scribner exchanges, found reasonable and granted as requested.

March 17: Application filed by Spalding Telephone Co. for authority to reduce its rates from $16.20 to $12 a year, found reasonable and granted as requested.

March 17: Application filed by the Inavale Telephone Co. asking authority to reduce rates from $1.35 to $1.00 a month.

March 17: Application filed by Home Telephone Co. of Inavale for authority to reduce rates to stockholders from 75 cents to 50 cents a month and for non-members from $1.00 to 75 cents a month.

March 28: Hearing on citation against the Northwestern Bell Telephone Co. to show cause why an order should not be entered reducing rates charged rural and switched subscribers.

NEW YORK.

March 22: Continued hearing on motion of the commission as to rules and regulations of the New York Telephone Co. in New York City.

OHIO.

March 30: Hearing in rate case affecting the Newark Telephone Co. and the Ohio Central Telephone Co. The hearing will be on the complaint of the Licking County Pomona Grange No. 60, which seeks a rate reduction from the present $6 to $4 a quarter.

OKLAHOMA.

March 6: Petition for rehearing on order, prescribing rates for the Southwest Telephone Co. at Meeker, denied.

The company had notified the commission that the prescribed rates would be put in effect March 1 for a test period ending June 15, 1933, at which time the company would apply for further hearing in the case should results of such test period prove not satisfactory.

March 21: Hearing on investigation of telephone rates, etc. This hearing is restricted to the question of zone rates at Muskogee.

WISCONSIN.

March 20: Hearing continued through March 23 in Milwaukee in the Wisconsin Telephone Co. state-wide rate investigation.

March 24: Hearing in Tomah on rural rates of the Lemonweir Valley Telephone Co. in the vicinity of Tomah and of the Northwest Telephone Co. for service in Tomah.

April 5: Hearing at La Crosse on rates of the La Crosse Telephone Corp. The rates charged at Onalaska will also be investigated at the hearing.

April 10: Hearing to be held in the Milwaukee courthouse in the Wisconsin Telephone Co. case as to whether the company has placed too large an investment in its plant, postponed to this date from March 17.

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Companies Are Urgently Requested to Forward to Us Promptly News Concerning Construction, Rebuilding, Financing, Election of Officers, Sales and Purchases of Exchanges or Other Activities

Construction.

GREENSBURG, IND.—The Decatur County Independent Telephone Co. plans to spend $18,000 for the improvement of its plant within the next few months, was the announcement made last month by Samuel Tomlinson, general manager.

Five years ago the wires in the eastern half of the city were placed in underground conduits. Now the company will carry on the same construction in the western half of the city.

Miscellaneous.

MATTOON, ILL.—The Illinois Supreme Court has reversed the decision of the circuit court of Christian County in the case of R. A. Lumpkin and other stockholders versus the Assumption Telephone Co. It was the evidence in the lower court that the telephone company mortgaged its property without the consent of the stockholders. The Illinois Commerce Commission approved the mortgage and the circuit court gave a like decision. The state supreme court directed the commerce commission to hold the mortgage invalid. The Assumption Telephone Co. on March 11 filed notice with the supreme court asking that a rehearing be given.

RANTOUL, ILL.—Rantoul was without telephone service on Wednesday afternoon, March 8, following a fire in the switchboard of the Eastern Illinois Telephone Co. The blaze caused undetermined but heavy damage.

OXFORD, MICH.—Fred Cressman, 47 years old, connected with the Michigan Bell Telephone Co. for 17 years as manager in several towns, died at the Oxford hospital on February 10 of a complication of diseases, following an attack of influenza. He was born in Oakland county and had lived there all of his life.

He leaves his widow of Oxford, his mother of Pontiac; two sisters and three brothers, two at Pontiac and one at Oxford.

THIEF RIVER FALLS, MINN.—A fire that raged in 41 degrees below zero weather wiped out the telephone exchange here of the Northwestern Bell Telephone Co., a loss of about $16,000. In addition to the exchange being destroyed, the city auditorium and a garage were razed, making a total loss of approximately $250,000. Practically all the city records were destroyed.

Olga Knutseth, night telephone operator, remained at the switchboard in the face of the menacing smoke and flames to warn city officials and residents when the fire threatened to spread to several blocks of homes and business buildings. Finally she was forced to desert her post when the room became filled with dense smoke.

CLEVELAND, OHIO.—The National Acme Co. has used the telephone to call 50 men back to work, according to recent information.

MARION, OHIO.—J. T. Carliss, of Johnstown, Pa., has been appointed vice-president of the Ohio Associated Telephone Co. of Marion, to succeed B. T. Van Voorhis.

MILWAUKEE, WIS.—Miss Nellie A. Linehan, long distance chief operator of the Wisconsin Telephone Co. since 1908, died on January 27 at her home. Her health had been poor since she underwent an operation a year ago.

Miss Linehan was born in Milwaukee and educated in the parochial schools here. She began working for the telephone company in 1891 as an operator. She was transferred to the long distance department in 1900 and was promoted in 1908 to the position she held at the time of her death.

She was a member of the Wisconsin Chapter, No. 4, of the Telephone Pioneers of America.

RIPON, WIS.—Working in 25-below-zero weather, crews of the Northwest Telephone Co. and the Western Union Telegraph Co. repaired cables and lines of communication which were thrown out of service last month when fire destroyed several business establishments and buildings.

Approximately 300 telephones were affected, in the southeastern portion of the city, which are served by one of the big cables that broke during the fire.